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ORIGINAL COMMUNICATIONS.

ART. XXVII.—ON VERATRUM VIRIDE. By Thos. R. Mitchell.

(Extracted from an Inaugural Essay.)

EXPERIMENTS.

The decoction, which was of a slight red colour, and somewhat mucilaginous appearance, formed precipitates with subacetate of lead in solution, with a persalt of iron, and alcohol. Alcohol also rendered it turbid, indicating the presence of gum; the taste was nauseous and slightly bitter. The decoction and tincture both redden litmus paper, and have their colour deepened on the addition of an alkali. With iodine the decoction struck a blue colour. There is a red colouring principle contained in this root which is taken up by alcohol; less so by ether, and still less by water.

An alcoholic tincture was made by digesting ℥j. of the bruised root, for four days, in ℥ij. of alcohol. This tincture was of a beautiful red or wine colour, and bitter taste. This was filtered, and the clear liquid evaporated. The extract thus obtained was of a reddish brown colour, even resinous fracture, and when chewed, left a very acrimonious taste on the mouth, which lasted for two or three hours. It resembled burnt sugar in smell, and, when first taken into the mouth, resembled that substance in taste.

This extract was dissolved in alcohol and boiled with a

small portion of animal charcoal, filtered while hot, and on evaporation yielded a substance somewhat lighter in appearance, irregular in shape, interspersed with numerous small, shining crystals. It had lost its sweet taste, but retained its bitter one; was soluble in water and nitric acid, and insoluble in ether.

A portion of the bruised root was digested for three days in ether. The tincture was slightly tinged with a red colour, possessing little of the bitter taste imparted to alcohol and water. The colour was deepened on the addition of an alkali. On evaporating this tincture, a substance adhered to the sides of the vessel of a red colour, somewhat unctuous to the fingers, insoluble in alcohol and water, but soluble in ether and a solution of carbonate of potassa.

A decoction was made by boiling for fifteen minutes ℥iv. of the root in cong. ss. of water; this was filtered, and a solution of subacetate of lead gradually added as long as any precipitate was formed. A stream of sulphuretted hydrogen was transmitted through the liquid, after filtration, to get rid of the excess of acetate of lead. The liquid was again filtered to remove the excess of sulphuret of lead; it was next concentrated by a gentle heat, and boiled with a small quantity of carbonate of magnesia; filtered, and the residue on the filter edulcorated with cold water; after the magnesia had subsided, the clear liquid was poured off and treated with boiling alcohol. The liquid was evaporated, and a very minute quantity of a slight brown or grayish substance was obtained. This was exceedingly bitter, and half a grain produced a very great desire to vomit, which lasted for an hour. Owing to the very small quantity obtained, I was unable to experiment or ascertain its precise nature. It was reddened by the action of nitric acid, and I am of the opinion that it was the active proximate principle.

From these few experiments, I concluded that there exist in this plant, 1. gum; 2. resin; 3. starch; 4. red colouring matter; 5. wax; 6. sugar; 7. a bitter proximate principle, supposed to be analogous to Veratria; 8. gallic acid, combined with the preceding.

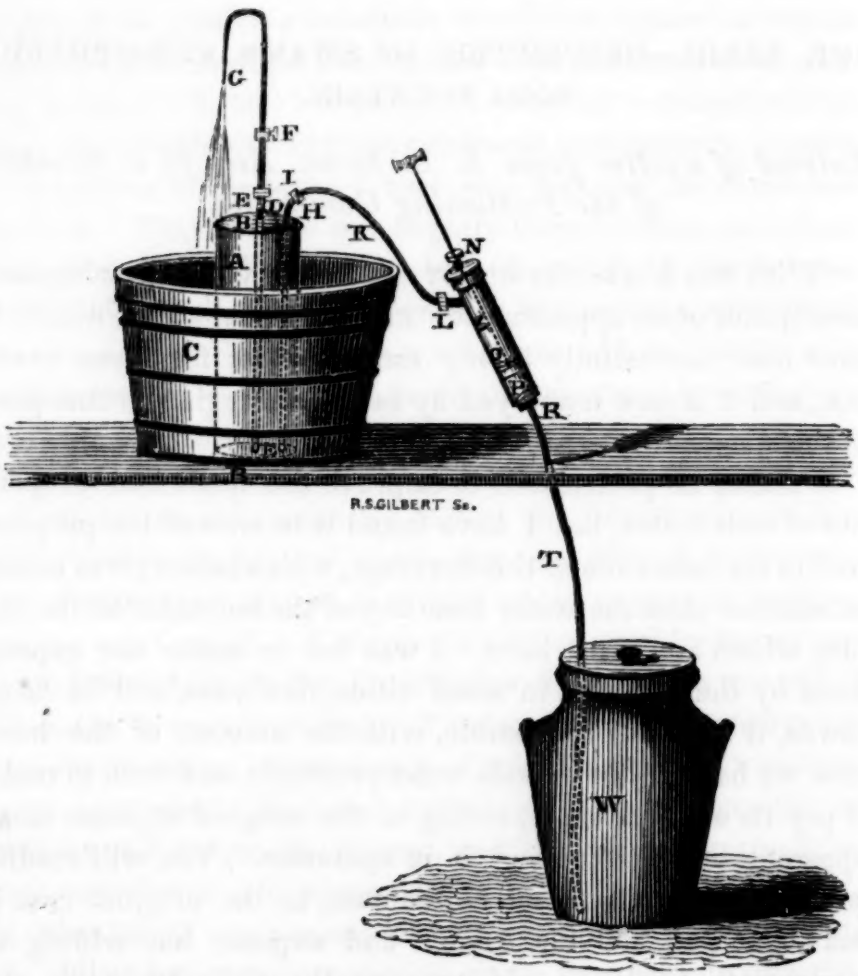
ART. XXVIII.—DESCRIPTION OF SWAN'S ATMOSPHERIC SODA FOUNTAIN.

Extract of a letter from L. B. Swan, Esq., to a member of the Publishing Committee.

"With this I take the liberty of sending you a drawing and description of an apparatus for making soda water, which I have used successfully in my establishment for three years past, and it is now employed by several druggists in this part of the state.

It makes no pretensions to improve the medicinal properties of soda water, but I have found it to answer the purpose well in the formation of this beverage, which in fact gives better satisfaction than the water from any of the fountains on the old plan which are in use here. I was led to make the experiment by the fact, that in small cities, like ours, and in large towns, it is almost impossible, with the amount of the business we have, to make soda water profitable, and even to make it pay its own expenses, owing to the original expense of an apparatus and the keeping it in operation. You will readily perceive the economy of the fountain, as the original cost is but about $30, and the trouble and expense but trifling in comparison with the old process; the difficulty from the fermentation of syrup during the warm season being also entirely obviated by the tartaric acid. However, as I wish to have the thing stand upon its own merits, I will say no more in commendation. I send the drawing and description for your inspection, and such other gentlemen of the College of Pharmacy to whom you may choose to submit it, and shall consider it a favour if, after examining, you will say what you think of it. I might send the certificates of respectable medical and scientific gentlemen who have examined it, but as my only object is to introduce it to your notice I will not trouble you further.

Rochester, August 10th, 1837."



A. represents the fountain, which is a cylinder, or air-vessel, of copper, about 24 inches in length and 10 inches diameter, with convex heads, B B., the inner surface being thoroughly coated with tin.

D. A tube of lead or tin, about three-eighths of an inch in diameter, passing through the centre of one of the heads of the air-vessel, descending to the bottom, and open at the ends E E, into which a stop-cock F is inserted, and a discharging pipe attached with an orifice $\frac{3}{32}$ of an inch in diameter G.

H. Another tube of similar dimensions passing through the margin of the same head, and in like manner open at the ends.

I. A valve at the upper termination of the pipe H, opening downwards.

K. A lead pipe connecting the pipe H. with the discharging aperture L. of a forcing pump M. The cylinder of the pump is constructed of a composition of lead and tin or other suitable material, about ¼ of an inch in thickness, two inches in diameter and 12 inches in length, with brass cap and boxes, a packing box N. at the top around the piston rod, a valve O. in the piston opening upwards, and a valve P. in the bottom box R. opening in the same direction.

T. A lead pipe attached to the lower box R. and passing into the reservoir W. placed in the cellar, or at a convenient distance in any other situation. The reservoir is a stone ware jar of sufficient dimensions to contain about 12 gallons.

C. The ice tub, in which the fountain is placed and secured; the divided half of a barrel will answer the purpose and is of a suitable size.

The couplers connecting the pipes, as represented in the drawing, are of brass, of the ordinary kind, accurately fitted.

The stop-cock is also brass, very nicely adjusted, and may be inserted in the pipe below or above the counter.

The pump is secured by being firmly soldered to a metallic plate, and the plate fastened by screws to a plank placed perpendicular, so that the position of the pump may be at a convenient angle for working, the plank secured at the top to the counter, and at the bottom to the floor.

It will be perceived that the whole apparatus must be made in the very best manner, and nicely adjusted, as it is required to sustain a considerable degree of atmospheric pressure.

The dimensions of the fountain and reservoir may be with propriety increased. However, those given will generally be found sufficient.

Manner of using the Fountain.

Prepare any of the varieties of syrup in the usual manner, and dissolve in each gallon of the same 7 ounces of tartaric acid; put into the reservoir any quantity of pure water which

it will contain, and dissolve in each gallon one ounce of super-carbonate of soda; apply the handle to the pump, and, after forcing into the fountain a sufficient quantity of the solution of super-carbonate of soda from the reservoir to procure as rapid a discharge as is desired, pour into a half pint tumbler about one fluid ounce of the syrup prepared as above, and open the stop-cock until the tumbler is filled.

For soda water without syrup, dissolve 8 ounces of tartaric acid in one gallon of pure water, and use in the same manner and in like quantity as the syrup.

ART. XXIX.—NOTE UPON VERATRIA, AND ITS USES.

By Augustine Duhamel.

The now extensive use of this vegetable alkaloid, and the limited knowledge of the manner it is employed in medical dispensation, from there being no published formula of its preparations, presents an inducement to give a few details in relation to it.

It is believed to have been first used in this city by Dr. S. Jackson, for whom some was imported by Mr. Durand, a few years ago, when but little known here, and then only recently introduced in medical practice in Europe. Its effects were tried in neuralgic affections by Dr. Jackson, and with signal success; so much so as to oblige his constant recurrence to it in similar cases.

For the discovery of Veratria we are indebted to those indefatigable chemists, Pelletier and Caventou, the pioneers of a new branch of Chemistry, whose labours in this department of science were rewarded by the great discoveries of Quinine, Strychnine, Brucine, and other proximate elementary substances of vegetables; by them a wide field has been opened for future investigation to the lover of Chemistry.

In 1819 these gentlemen detected Veratria in the Veratrum Sabadilla, Veratrum Album, and the Colchicum. The following is the mode commonly pursued to obtain this substance.

Boil the seed of the Veratrum Sabadilla with water; when, by repeated decoctions, all the soluble active matter is extracted, evaporate to diminish its volume. Treat this liquid with a solution of acetate of lead until it ceases to furnish a precipitate. Filter and pass through the liquid a current of hydrosulphuric acid gas—which will precipitate the excess of lead in the form of sulphuret. Then expose to heat to drive off the excess of acid, and having again filtered it, boil with an excess of magnesia. In this manner the acetate of veratria is decomposed, and the veratria precipitated with the excess of magnesia. The precipitate is then collected upon a filter, washed with cold water and dried; it is afterwards powdered, treated with boiling alcohol and animal charcoal, then filtered, and, lastly, abandoned to spontaneous evaporation, which leaves the Veratria in the form of a white powder.

Veratria is of a dull white colour, but generally grayish as brought from the laboratories. It is pulverulent and inodorous; but so extremely acrid, that the smallest particle of this subtile powder coming in contact with the nostril excites violent sneezing, which lasts for some time. It has a very acrid taste, without any bitterness. It is sparingly soluble in water, very soluble in alcohol, but less so in ether. It restores litmus reddened by an acid. It forms salts with the acids, but only one of which is crystallizable—the sulphate—and that only partially. With the other acids an uncrystallizable mass is formed resembling gum.

The product is not abundant; on the contrary, so little does the V. Sabadilla yield, although furnishing more than the other varieties of this plant, and the operation being attended with considerable trouble, as to make it costly—so much so, as to expose the article to sophistication. This makes it very necessary to exercise some caution in its selection.

A fraud of the kind, practised upon our druggists about two

years ago, led to the disparagement of this active substance. It was furnished to a number of physicians, about making their first essay upon the power of Veratria, and it proving comparatively innocent disappointed their expectations. The imported article, bearing the label and seal of well known French houses, may be relied upon as good. It is made here of good quality by Mr. DENIS, operative chemist, formerly attached to the laboratory of ROBIQUET, and now in the employ of Mr. ROSENGARTEN of this city.

Veratria exerts a special action upon the nervous system. It is most commonly employed as a local application in Tic Douloureaux and Neuralgia. It is in nervous headache when thus applied that it has been most successful, affording almost instantaneous relief.

For external use, the most common form in which it is prescribed is this:

℞. Veratriæ, gr. j.
Cerati. Simp., ʒj.
M.

A small portion of this is rubbed with the end of the finger upon the part affected.

It is occasionally directed to be made as strong as four grains to the drachm. Sometimes simple lard is preferred to the Cerate; but for frictions the best medium by which to convey Veratria by absorption through the skin is the oil of laurel,—the fine green concrete oil of the Laurus Nobilis,—in which it is soluble, forming with it a liniment of fine colour and agreeable odour. So powerful a sternutatory is it, that some delicacy is enjoined upon the person manipulating with it to guard against its effects.

It is administered internally in substance and in the form of tincture. The tincture is given in the dose of 5, 10 or more drops, and is thus made:

℞. Veratriæ, gr. j.
Alcoholis rect., ℥j.
M.

In substance it is given in the dose of $\frac{1}{12}$th and $\frac{1}{8}$th of a

grain in conjunction with some inert body, or combined with the extracts of lettuce, hyosciamus, or belladonna. Its effects, when taken internally, have been asserted to be those of a a drastic purgative; but these have not been fully realized. In large doses tetanus is the consequence, followed by death.

ART. XXX.—ON NEUTRAL MIXTURE. By John Goodyear.

(Extracted from an Inaugural Thesis.)

Some two or three years since, an article was published in the Journal of the Philadelphia College of Pharmacy, of which Mr. Joseph Scattergood was the author, on the subject of Neutral Mixture. The object of the author seemed to be to expose the great diversity then, and still, existing in the prescriptions of physicians for that remedy, when their object was, and is, in the majority of cases, to use a medicine of uniform strength; and to propose a form or forms which would meet the views of practitioners in general, and render it specific in its composition, and essentially the same. A single glance at the prescriptions cited by him as of every day occurrence, is sufficient to convince any person who has the least knowledge of medicine, that there is not only great room for improvement, but great need of it. The object of the author seemed to be, also, to induce physicians to substitute for the ordinary prescription of lemon juice and the carbonate of potassa, the citrate of potassa, as prepared by the manufacturing chemist, dissolved in water. This, with something to render it pleasant, would no doubt be a good substitute; and, taking into consideration that prescriptions are not always compounded by the most skilful and experienced pharmaceutists, would probably be the best form of administering this remedy. But doubts exist whether or not it makes so desirable a preparation as the recent lemon juice

and the carbonate of potassa, when these are prescribed and compounded with judgment and care. In consequence of the great length of time since this remedy was introduced into medical practice, and the great benefits arising from its use, it is not probable that physicians generally will be easily persuaded to forsake the old form, and adopt in its stead any substitute.

Under such circumstances, it would probably be best to suggest such modifications of the old form as would be likely to meet the views of those who are partial to it, and render it (as Mr. SCATTERGOOD truly says) "what all admit it is not now,—of uniform strength." It will be the object of the writer in the subsequent part of this essay to show how far this end, so desirable, can be attained. Saline, or Neutral Mixture, as it is now indiscriminately called, has been in use as a therapeutic agent for more than a century. It was originally prescribed in the form of the modern Effervescing Draught; the impure corbonate of potassa, then known as the Sal Absinthii, being employed, instead of the Alkaline Salts now used. As a general rule, the alkali was not used in larger proportion than from ℈i. to ʒss. to the ounce of lemon juice, being a much smaller quantity than is necessary to saturate it, as will hereafter be shown.

Of late years, this remedy has risen high in the estimation of both European and American practitioners. In consequence of the difficulty of procuring lemons in the interior of this country, the use of this preparation is confined almost exclusively to the Atlantic cities. As in some seasons of the year no prescriptions are so common as those for Neutral Mixture, perhaps no one has so good an opportunity of judging of the superiority of some, and of the inferiority of other forms, as the apothecary. It is often the case that the physician leaves it entirely to the discretion of the apothecary to select a form, by writing his prescription thus

℞. Misturæ Neutralis, ***.

Perhaps, having been acquainted with the form used in one

store, he is under the impression that all others use the same, under like circumstances; and we have no doubt that greater diversity arises from this than from any other cause; for it may be said with truth, that there are almost as many different forms in use as there are stores in which this medicine is prepared. Not long since, a physician complained, that, having prescribed Neutral Mixture for his patient, the prescription was taken to a respectable apothecary to be compounded, and being under the impression that the medicine was one of the most pleasant, (and probably having told his patient so) he was astonished to hear, on his next visit, that the medicine was very unpleasant; and on examination found, that to a quantity of (what probably was) lemon juice, so much potassa had been added as to render it of a dark brown colour, and of a bitter, strongly alkaline taste. Another physician, a few days since, requested that a prescription he had given for Neutral Mixture should be repeated, and the tartar emetic in it omitted. On being informed that it contained none of that salt, and that it was not customary with us to use it, except when specially prescribed, he replied, that he was under the impression that it was prepared always according to the recipe in ELLIS' Formulary (which contains tartar emetic in the proportion of one grain to f. ℥ivss.) If any thing more is necessary to show that great misunderstanding exists as to the ingredients of this medicine, perhaps it would be proper to state, that in most cases lemon juice is used; often citrate of potassa, and sometimes citric acid. Sugar is used in the proportion of from ℥i. to ℥ss. to f. ℥iv., and not unfrequently sweet spirits of nitre, in the same proportion; so that in every instance the sensible properties at least vary much. Copies of only a few original prescriptions would be necessary to show that there is as much difference in the prescriptions of physicians, as there is in the forms of apothecaries.

For copies of some of these we would refer the reader to Mr. SCATTERGOOD's paper in the 5th vol. of the Journal of the Philadelphia College of Pharmacy, page 16.

Some physicians prescribe the bicarbonate of potassa, instead of the common salt of tartar. It does not much alter the character of the medicine; but is to be preferred as making a much nicer preparation. The salt of tartar always contains silica; and when used in this preparation, the silica exists in the form of a flocculent precipitate. This precipitate, though entirely inert, might as well be avoided, when it can be so easily done. Neutral Mixture is preferred by some practitioners in the form of the Effervescing Draught. For this, the bicarbonate of potassa is certainly to be preferred, as it seems that not only the agency of the citrate of potassa is desired, but likewise that of the carbonic acid gas, which is disengaged during the action of the acid on the alkali. The reason why the bicarbonate is to be preferred in this case is very evident. The following prescriptions for the Effervescing Draught are common.

℞. Potassæ bicarb. ʒiij.
Aquæ, ℥iij.
Liqua.

Sig. Half a table spoon full with as much lemon juice in the state of effervescence.

℞. Potassæ bicarb. ʒiij.
Aquæ, ℥iv.
Liqua.

Sig. A table spoon full with as much lemon juice in the state of effervescence.

℞. Sal. Tart. ʒij.
Aquæ, ℥iv.

The dose of this is the same as that of the last prescription. It will not be very difficult to discover the disparity existing between these. Having shown the great want of uniformity in this preparation, we will proceed to state a few facts furnished by actual experiment. Lemons yield from f. ʒiij. to f. ℥iss. of juice. We have been sometimes disposed to think,

from observation, that when a lemon has been exposed in a dry situation, until the skin becomes partially dried, it affords a considerably larger portion of juice than it would have done in its recent state. Could this be proved by experiment, we should try it. It is said by some that the quantity of citric acid in lemon juice varies as much as from 20 to 30 per cent. Whether or not they had particular reference to the imported lemon juice we cannot say; but judging from the various reports of the manufacturing chemists, we should say they had. We have found by experiment that the recent juice also varies considerably in the quantity of acid it contains, and that it varies just in proportion as the fruit becomes drier, until decomposition commences; and we may add, just in proportion as the mucilaginous and saccharine matter seems to decrease. To try this experiment, three sorts of lemons were selected. The first were fresh. To saturate an ounce of juice expressed from these it required ℨij. of the carbonate of potassa. The second had been rolled separately in paper, and kept in a dry situation for about a month, so that their original dimensions were considerably reduced, but they retained their natural colour, odour, &c. To saturate an ounce of the juice furnished by these, about 46 grains of the carbonate of potassa were necessary. The third were such as had by time and exposure become almost brown, and hard externally. An ounce of juice expressed from these, required 50 grains of the carbonate of potassa to saturate it. Under such circumstances as those just related, the bicarbonate of potassa was used, and we found in the several instances from ¼ to ⅓ more of it to be necessary. We have already suggested the propriety of using the bicarbonate instead of the regular carbonate of potassa for making the Neutral Mixture, but since experimenting we have thought it immaterial which was used. The object of using the bicarbonate instead of the regular carbonate was to get rid of the precipitated silica, but as the mixture is opaque made with either, a preference would be useless. From what we have learned by experiment and otherwise, we are induced to think that in every instance it

would be better to prescribe the alkali in definite quantities, and to use them in such proportions that they will certainly be neutralized; for an excess renders the preparation very unpleasant, and we are informed that if an excess of either the acid or the alkali exists, the former would be much preferred. We would recommend the addition of sugar in every instance where the condition of the patient does not contra-indicate its use; of course the physician only can judge of this. The following form is essentially the same as that officinal in some of the foreign Pharmacopœias for making the simple Neutral Mixture, and is probably the best.

℞. Suc. Limon. recent.	℥iij.
Potassæ carb.	ʒij.

Misce et adde,

Aquæ fluvial.	℥iij.
Sacchar. alb.	℥ss.

By following this prescription the alkali will always be saturated, and should there be an excess of the acid, no evil consequences can arise from it. There is also an officinal Compound Neutral Mixture which differs from the simple, principally in containing the antimonii et potassæ tartras. Should the physician wish to add either this salt or the spiritus nitri dulcis, it would be an easy matter to give directions to that effect. To those who prefer using the citrate of potassa, we would recommend the following form:

℞. Potassæ citrat.	ʒiv.
Aquæ fluvial.	℥vi.

Liqua. Dein adde

Sacchar. alb.	℥ss.
Acaciæ gummi pulv.	ʒij.
Ol. Limonis,	gtt. iij.

Misce.

The object in adding the gum, is, to make the preparation resemble, as much as possible, that made from fresh lemon juice, the mucilage in which contributes much to render it pleasant.

It is but seldom that the citric acid is directed to be used; but when it is, the following form would be proper:

℞.	Potassæ bicarb.	ʒiij.
	Acidi citrici,	ʒiss.
	Aquæ fluvial.	ʒvi.

Liqua. Dein adde.

Sacchar. alb.	℥ss.
Acaciæ pulv.	ʒij.
Ol. Limonis,	gtt. iij.

For the Effervescing Draught the following form would be proper:

℞.	Potassæ carb.	ʒij.
	Sacchar. alb.	℥ss.
	Aquæ fluvial.	℥iij.

Liqua.

To be used in such quantity as the physician may direct, with an equal portion of fresh lemon juice.

But if a solution of citric acid would be preferred, the following forms would be proper:

℞.	Potassæ bicarb.	ʒiij.
	Sacchar. alb.	℥ss.
	Pulv. Acaciæ,	ʒj.
	Ol. Limonis,	gtt. iij.
	Aquæ fluvial.	℥iij.

M. ft.

℞.	Acidi Citrici,	ʒiss.
	Aquæ fluvial.	℥iij.

Liqua.

These are to be kept in separate bottles, and used in equal portions, as may be directed.

It would probably be better not to add more than one drachm of gum arabic, because if too much mucilage be pre-

sent, too much of the carbonic acid gas will be retained, and it will be necessary to change wine glasses, which are generally used, and certainly most convenient, for larger vessels.

ART. XXXI.—MEDICO-BOTANICAL NOTICES.

No. XIII.

Coptis Teeta. Under this name a plant has been described by Dr. WALLICH, the root of which is medicinal in its properties. The root constitutes a drug known among the Mishmees and Lamas in the mountainous regions bordering upon Upper Assam, by the name, *Mishme Teeta,* by the Chinese it is called *Honglane;* among these three nations it is in great estimation, and in universal use as a powerful tonic and stomachic. It was first brought before the notice of the author by Captain JENKINS, agent to the Governor General on the North Eastern frontiers of Bengal, who transmitted to him a small supply of it; the plant, itself, was afterwards procured for him by Lieutenant CHARLTON, in a live state. "Quantities are sent down to Assam in neat little baskets, with open meshes, made of narrow slips of ratan, or some such material, and measuring three to four inches in length, by two and a half in breadth and one and a half in width. Each basket contains about an ounce of small pieces of the root, from one to three inches long; they are nearly cylindric, uneven, scabrous, more or less curved, of a grayish brown colour, varying in thickness from the size of a crow quill to double that diameter. The root is perfectly dry and brittle; occasionally a few fibrillæ are issuing from one end; the inside is hard, somewhat cellular, the outside of a dingy yellow colour. The taste is intensely and purely bitter, very lasting

and with only a very slight aroma; on mastication the root tinges the saliva yellow, its interior is bright yellow, or gold coloured. It possesses no smell whatever.

Coptis belongs to the sub-division of *Ranunculaceæ*, called *Helleboreæ.*

Coptis Teeta; leaves three-cleft, segments petiolate, pinnatifidly lobed, lobes deeply and very acutely and setaceously serrate, scape few flowered, bracts foliaceous, linearly three parted. Root sub-carnose, much divided, fibrillous, within of a yellow golden colour. Stalk * * *? Leaves erect, glabrous, longly petiolate, texture firm and rigid, resembling, in habit, the frond of a dorsiferous fern, ovate cordate, attenuately accuminate, four inches long, segments supported by a partial petiole half an inch long,—lateral ones semi-cordate ovate, externally almost biparted, two inches long; intermediate one twice as large, a little longer than the petiole, attenuate towards the point, cuneate, sub-decurrent at base: all incisely pinnatifid, lobes obtuse, with broadish serratures terminated with setæ, reticulated, superior nerves pubescent, inferior veins tortuously forked. Petiole slender, as long as the leaf, dilated at base. Scape round, erect, delicate, a little striate, as long as the leaf, bearing three flowers at its apex, (rarely more,) which are small, alternate and pedunculate. Sepals oblong, lanceolate, attenuate, acute, whitish, parallelly veined, glabrous, as long as the claw, fugaceous. Petals linear ligulate obtuse, one-third the length of the sepals, flattish? Stamens and pistils many; anthers plano-rotund, whitish. Immature carpels membranaceous, containing from three to five ovules, shortly stipitate and terminated by a sub-cylindrical fleshy style, as long as the carpel, and declinate, stigma within scabrous. Bracts under each peduncle foliaceous, narrow linear, with setaceous serratures on the margin, below three parted. Peduncles elongated.

There are only three species of Coptis, viz:—C. trifolia, C. asplenifolia, and the present; the last bears greater resemblance to the first, which affords the drug, commonly known as "Gold Thread."

The Mishme Teeta has been experimented upon by the late W. Twining, Esq., of the Bengal Service. The following is the report he gives of it:—"The powder of this root is of an intensely bitter taste, which is accompanied with a slight degree of a peculiar aroma. The sensation produced in the mouth subsides but slowly, and is more pleasant than any simple bitter. Judging from the taste, it does not possess much astringency; and this opinion is confirmed, by finding that neither the tincture nor the infusion is much affected by the solution of sulphate of iron. Four hundred and eighty grains of the root, when coarsely powdered and macerated in proof spirit for five days, were found to have lost one hundred and eighty grains. The residue of the above tincture, when dried, amounting to three hundred grains, was macerated for thirty hours in distilled water, and only twenty-six grains were found soluble in water; as the residuum when dried weighed one hundred and ninety-four grains. The maceration in water was not continued longer than thirty hours, because fermentation had commenced, the weather being very hot at the latter end of May.

"If we may be allowed to pronounce an opinion after trying the effects of the powder and of the tincture in seventeen persons, this medicine is highly deserving of attention. The persons on whom the trials were made, were chiefly patients who were suffering from degrees of debility, after the subsidence of acute chronic diseases, and one was a patient who was of a scrofulous habit, and reduced to the lowest stage of debility, by external suppuration of great extent. The effects of this medicine as a bitter, and its influence in restoring appetite and increasing the digestive powers, are very remarkable, and it may be said to possess all the properties of our best bitter tonics. It has seldom appeared to have the effect of constipating the bowels; but in this, and many other respects, I consider further trials necessary to ascertain fully the medicinal properties of this drug."

Pucha Pat. This name is given to a drug which Dr.

WALLICH supposes to be derived from *Marrubium odoratissimum*. It is very common in the bazars of Hindustan, and is imported by Mogul merchants. It is used as an ingredient in tobacco for smoking and for scenting the hair of women, and the essential oil is in common use for imparting the peculiar fragrance of the leaf to clothes among the superior classes of natives. In addition to the above particulars, the following account of the plant is given by Dr. WALLICH; it was obtained from Mr. GEORGE PORTER of Penang. The Pucha Pat plant is evidently of the family of Labiatæ. It forms a shrub of two or three feet in height. The obtusely four cornered branches, and the leaves, are juicy and somewhat fleshy and covered, especially the inferior surface of the latter, with a great deal of soft pallid pubescence, which gives the plant a grayish appearance. All the young parts are densely villous. The leaves are opposite, petioled, ovate, obtuse, grossly and obtusely lobate, crenate, measuring from two to four inches; the lowermost on the branches are sub-cordate, all the others are cuneate and entire at the base; the upper surface slightly rugose; under surface pallid, with very thick rib and nerves, and largely reticulated veins.

Alhagi Maurorum. This plant is a very spiny under shrub, growing in Egypt, Syria, Mesopotamia, Antolia, &c. It is the Hedysarum Alhagi, L., and was discovered and described by RAUWOLF, in 1637. TOURNEFORT found it in the Island of Tinas in 1700. The stems of this vegetable afford an excretion, of a sweet sugary nature, called Persian Manna, much used in Persia, and sometimes in Bengal. According to TOURNEFORT, it is more especially around Tauris, a city of Persia, that it is collected. During very hot weather, there is perceived upon the leaves and branches, an exudation resembling drops of honey, which harden into grains; the largest of which equal coriander seeds; of these, reddish cakes—approaching to brown—are formed, full of dust and leaves, which alter their colour and perhaps diminish their virtue. It is pretended that it is necessary to collect the grains before the

rising of the sun, because they are melted by its action. The dose, as a purge, is about three ounces, mixed with an infusion of senna as ordinary manna. This article is also used as an aliment. M. HALIE, in the article Agul, in the part *Medicine* of the Encyclopedie Methodique I. 397, believes that the manna obtained from the Alhagi, is the substance upon which the Hebrews were nourished in the desert, but this is only one of innumerable conjectures as to the source of that supply of nutriment.

Alhagi Maurorum belongs to class Diadelphia, order Decandria, L., and to the family Leguminosæ of DECANDOLLE. In altitude it varies from two to three, or four feet; the stem is shrubby; leaves simple, obovate, oblong, with minute stipules. The flowers are purple in the middle, reddish about the edges and disposed in racemes along the peduncles. The calyx is five toothed, bell-shaped; corolla papilionaceous, with the petals almost equal in length, the vexillum obovate and complicated, the keel straight, obtuse, and the alæ rounded at the apex. The stamens are ten in number, united into two sets, ovary linear; style filiform, acute. The seed vessel is a roundish, slightly uneven legume, which is rather woody, staked, few seeded and without joints. Seeds kidney shaped.

J. C.

SELECTED ARTICLES.

ART. XXXII.—REPORT UPON A FORMULA FOR VESICATING TAFFETAS. Addressed to the Societie de Pharmacie, by M. Deschamps. By Cap & Soubeiran.

(*Translated by Augustine Duhamel.*)

In the Codex is found a formula for blistering taffetas given by M. Guilbert, in which are introduced garou or *sain bois* (Daphne Gnidium,) cantharides, euphorbium and myrrh. All these matters are treated by ebullition in water, and the liquid resulting is concentrated and spread upon the silk by means of a brush. Few have adopted this formula, as the taffetas easily peel off soon after preparation. It might also be said that the menstruum had not been well chosen. In 1818 M. Drouot published a more satisfactory one; it is composed of a mixture of tinctures of garou and cantharides—made both with acetic ether; a little colophony is dissolved in the mixture and then applied with a brush upon gummed taffetas. The excellence of the formula has been proved by the Editors of the Journal de Pharmacie; they had to find fault only with the employment of acetic ether—which does not give more advantageous results than sulphuric ether and costs much more.

We shall say as much in reproach of the formula which consists in dissolving the colophony in acetic ether, and mixing the cantharides in fine powder with this tincture; moreover, the powdered flies scattered upon the surface of these

taffetas, give them an unfavourable appearance to the eye. The formula proposed by M. Deschamps, is the following :

Take of	Cantharides in powder,	10 ounces,
	Euphorbium in powder,	1 "
	Alcohol of 35° B.,	2 lbs.

Introduce the matters into a matrass, heat by means of a water bath in a manner to boil the alcohol,—allow to cool, decant, filter, and add to the residuum

Alcohol of 35°,	1 lb.

Operate in like manner; mix the alcoholic tinctures together, and distil so as to obtain 2lb. 8oz. of alcohol; then—

Ichthyocolla,	7 drachms,
Water,	q. s. to make it swell;

The next day employ heat to dissolve it: strain, and mix with the residue of the solution; evaporate so as to have 12 ounces of liquid, and spread with a brush.

Let each layer dry, and give the last coating with a tincture made of one part of benzoin and three of alcohol of 35°.

It is sufficient to wet the skin with cold water when you wish to apply these taffetas.

The waxed taffetas may be replaced with white skin, but before applying the vesicating matter, it is necessary to give to the skin a coating of the following liquid:

Take of	Lampblack,	1 drachm,
	Gelatine,	2 drachms,
	Water,	1½ ounce.

M. Thierry has communicated a formula analogous to the preceding, and which he has always used with success; it is this:

Take of	Euphorbium,	q. v.
	Alcohol of 32°,	q. s.

Make a saturated tincture; spread successive coats upon wax-

ed linen, taking care to let each one dry, before applying another; then—

Balsam tolu,	1 part,
Powdered cantharides,	2 parts,
Sulphuric ether,	8 parts.

Of this tincture apply ten successive layers, upon the layers of euphorbium.

To insure the effect of these taffetas, moisten them with a small quantity of alcohol before application.

Lastly, Gentlemen, I would remind you that Messrs. Henry & Guibourt have published a formula, which consists in liquifying with double its weight of wax, the green oil that is obtained from cantharides by means of ether; the mixture is spread upon a sheet of waxed linen in the same manner as common adhesive plaster.

We can have no motive for giving the preference to either of the preceding formulas. We have sought to decide by experiments the relative value of these different vesicating taffetas.

M. Andral has been very willing to undertake these experiments.

We present the table resulting from the observations upon this subject gathered by M. Fournet, his resident assistant.

No. 1 is the taffetas according to M. Deschamps' formula; No. 2 is that of M. Thierry; the No. 3 according to formula of Henry & Guibourt.

Summary comparison between the three numbers.

Pain experienced.	Serosity at the raising of the blister.	Condition of blistered surface.	Time of drying.
No. 1.—Time of application, six hours. The pains felt were itching, prickings and heat. These effects were very prompt upon 5 patients, who could reply satisfactorily.	About 2 spoonsful of serous matter, limpid and of a citron yellow colour. Blister always well formed, except upon one patient, which broke during the night.	Simple redness of skin.	Desiccated almost always the sixth day.
No. 2.—Time six hours. The pains felt were prickings, smarting, and heat, which upon almost all the patients remained until the morning of the next day.	A spoonful and a half of serum. Blister well formed except upon one patient.	Skin slightly coloured red.	Desiccation obtained the sixth day.
No. 3.—Time four hours. Pains less sensible, and consist in prickings, itchings, and smarting.	Two spoonsful of serum and rupture of vesicle upon one patient.	Skin coloured rose red.	Desiccation obtained the fifth day.

Medical experience has given the advantage to No. 3; the blister is the quickest made, the pain less severe and of shorter duration, and the healing more prompt. These advantages are evidently owing to the absence of the euphorbium, whose persistant acridity is joined without any benefit to the more mild vesicating property of the cantharides. We are thus brought to give the preference to Henry & Guibourt's formula, although the product has not that appearance we are accustomed to find in the vesicating taffetas commonly employed.

This preparation presents a phenomenon somewhat remarkable; which is that the cantharadine often separates in crystals from the middle of the mass, which is likewise filled with a multitude of small white needles.

No doubt this preparation loses by contact with the air. It

ought to be kept in close vessels and only a small quantity separated at a time.

We ought in concluding to ask you to give thanks to Mr. Deschamps, whose production is that of a learned and judicious pharmaceutist.

(NOTE BY THE TRANSLATOR.)

The cantharadine plaster of HENRY & GUIBOURT alluded to in the above report, has been made repeatedly by Mr. DURAND for several years past. It was first made at the suggestion of a physician who desired to employ it in the vesication of an extremely delicate patient, and upon whom an ordinary blister would produce strangury; it fully answered his expectations. It is prepared by subjecting 1 lb. of powdered cantharides to several successive macerations in sulphuric ether, amounting in all to six pints. This upon evaporation yields about ten drachms of the green oil and extractive matter, which with ten drachms of white wax melted in it, furnishes a fine green plaster of good consistence for spreading and of pleasant odour. To preserve its activity, it requires to be confined in an air-tight recipient of small dimensions.

When you wish to use it, cut from adhesive plaster spread upon linen a piece the size of the intended blister, and spread over it with a spatula a very thin and regular layer of this plaster. Very little indeed is necessary. It adheres well and is very certain. It is optional whether a margin be left.

Its costliness will, however, prevent its being brought into general use.

Mr. CHARLES ELLIS, of this city, has introduced some of the blister cloth or taffetas of his own manufacture. Being recent it has not been as yet much used, but time will develope whatever merits it may possess.

It is not likely, however, that either of these will supersede the common blister plaster, which for cheapness and certainty, if carefully made from good flies, and well kept, will always command estimation.

ART. XXXIII.—DESCRIPTION OF THE WHITE SARSAPARILLA FROM TAMPICO, AND OF THE DIFFERENCES BETWEEN IT AND THE OTHER VARIETIES.—By J. J. Virey.

There has been presented to us by M. Gautheir, an apothecary of Paris, under the name of Tampico Sarsaparilla, a species or variety distinct in many respects from those met with in commerce, and which, nevertheless, is a true sarsaparilla. The means of distinguishing the best kinds, consist in being acquainted with all; hence the description of the present one appears to us of importance. Tampico is a port of the Gulf of Mexico, near to Vera Cruz, Honduras, and the other countries under the Tropic of Cancer, whence are derived the best kinds of sarsaparilla. These consist of long radicles attached to a head, and are folded upon themselves in bundles, in which manner they are exported; while the Brazilian sarsaparilla is without the head, and appears to be a distinct species in a botanical point of view—the stem being armed with thorns.

The article under consideration, presents the general structure of the true sarsaparilla, but it has not the brown or reddish colour belonging to the other kinds, its appearance is white, or of a less deep brown. The roots are striated, long, tenacious, and a little larger than the other varieties; they are destitute of the asperities or rigid hairiness of the sarsaparilla of Peru, and other countries. Besides, the sarsaparilla of Tampico, when chewed, is very mucilaginous; and has, independently of a slight degree of bitterness, a sweetish taste, which even appears a little sugary in some roots. Its ligneous medutillium is not large, and the cortical portion is doubtless very succulent in the fresh state, more so than in the others.

Generally the heads of this sarsaparilla are well developed, sometimes voluminous and suberose, as in China root, but of a pale colour; this lightness of tint pervades the plant and seems to indicate a large proportion of mucilaginous matter

in it. If this be of any utility in the properties of the medicine, the sarsaparilla of Tampico, under this point of view, will merit some preference; at the same time, however, the active part designated under the names of *smilacine* or *parigline* or *salseparine*, is not predominant.

This sarsaparilla presents all the characters assigned to the best species, with the exception of its lighter colour; there is reason to believe that it is a white variety of *smilax officinalis*, described by M. Kunth, in the *Nova genera et species Plantarum* of MM. Humboldt and Bonpland. We base this opinion, in the first place, upon the great resemblance, (colour excepted) between it and the true sarsaparilla derived from the same localities and found growing upon the borders of the Magdalena, in New Mexico, whence it is sent to Europe. Secondly, there are frequent examples of white varieties in many species of vegetables. These varieties depend upon colder or warmer localities, or degeneration by culture. What appears to give still more weight to this opinion, is the fact that the white varieties of vegetables are more abundantly supplied with mucilaginous elements, or possess active principles less elaborated. Now these characters will be recognised upon comparing the sarsaparilla of Tampico with the other kinds.

Circumstances may, nevertheless, present themselves, which will occasion a preference in favour of this sarsaparilla over others possessing more bitterness, and greater activity. The methods of treatment in which this kind of medicine is employed, should accord with the temperament, or intensity of the affection, for it is an error to suppose that recourse should be made to the most active principles.

Hence it is, that it will not be useless to try the comparative effects of many kinds of sarsaparilla, without confounding them indifferently, as has been done. This study can be effected in the hospitals, and may afford important therapeutic results with regard to the pharmaceutic preparations of this medicine now in use.

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ART. XXXIV.—RESULTS OF EXPERIMENTS MADE UPON THE MILKY JUICE OF LETTUCE. (*Lactuca sativa, L.*, the variety termed Roman.) By M. * * *.

The juice which I examined was collected in the month of July, when the temperature was 24 to 25 R., from stalks of the lettuce about to flower. It was of great purity and possessed an oily consistence at the moment of exudation, it concreted rapidly, at the same time that it acquired a brownish tint. It exhibited an acid reaction.

Five decigrammes of this juice, dried by exposure to the atmosphere, furnished seventeen centigrammes of residuum, or 34 per cent. This product, which, as is known, is very analogous to what is called Lactucarium by the English, occurs under the form of irregular fragments, reddish brown externally, whitish internally, not perceptibly attracting humidity from the atmosphere, taste very bitter, smell virose.

The different experiments which I have made upon this juice have induced me to regard it as composed of:

1. A bitter principle, soluble in water and alcohol, insoluble in ether, not precipitated by the salts of lead.
2. Albumen.
3. Caoutchouc.
4. Wax.
5. An acid of which I have not been able to determine the nature, on account of the small quantity of juice which I had at my command.
6. Chloride of calcium.
7. Phosphate of lime.
8. Potassa.

It may also be possible, that gum and acetic acid exist in it. Gum has been stated to be present by Shrader, as well as a peculiar resin, of which I have not detected any traces; but I have found gum in the extract of lettuce obtained by expression, as also acetic acid and potassa.

As the plant with which we are now engaged, is only a variety of that which furnishes the extracts of lettuce employed in pharmacy, it must, I think, be admitted, that the lettuce juice obtained by me, has a great resemblance to, if not perfect identity with lactucarium. Now, from the characters which I have assigned to this product, it is plain that it differs essentially from the thridace, and that it has been erroneously confounded with it. In fact we know that the thridace powerfully attracts humidity from the atmosphere, which is attributable to the large proportion of deliquescent salts contained in it; that its taste is ordinarily saline and extractive, instead of being bitter, and that its smell is not virose. The necessity of establishing a distinction between these two medicines has already been pointed out by M. Chevallier, but it is really founded in facts, since Drs. Cox, Bidault de Villiers and Dumas, have made their experiments upon the lettuce juice (exudation) which they named lactucarium, and Dr. François has experimented with the extract obtained by expression, and to which he has given the name of thridace. It is surprising, that after such a distinction has been made, several formularies should state that the thridace is prepared with the juice of lettuce obtained by incision; this is an inaccuracy, which I have thought it necessary to point out, since it has the tendency to lead the physician into error, as to the chemical and therapeutic effects of this medicine, and it may lead him, in some cases, to suspect the honesty of the pharmaceutist.

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ART. XXXV.—OF SASSARUBRIN, A RESIN EVOLVED BY SULPHURIC ACID FROM OIL OF SASSAFRAS, WHICH IS REMARKABLE FOR ITS EFFICACY IN REDDENING THAT ACID IN ITS CONCENTRATED STATE. By R. Hare, M.D., &c., &c., &c.

(From the American Philosophical Transactions.)

The crimson colour produced by the admixture of oil of sassafras with sulphuric acid, is due to a peculiar resin, which I would call sassarubrin, being elaborated from the oil of sassafras, by its reaction with sulphuric acid, with phenomena which are striking, and, in some respects, singular. If a mixture be made of equal parts of the oil of sassafras, alcohol and sulphuric acid, on raising the temperature to a certain point, the whole mass rises up in a resinous foam, of a beautiful colour, between copper and purple, with a metallic brilliancy. In some instances, it has been partially forced out of the retort through the beak in a cylindrical mass, which acquired, on cooling, the consistency of pitch. This pitchy substance is a compound of the resin above alluded to and sulphuric acid, with which it forms a soluble substance, neutralizing its sourness to a certain extent. By steeping this subacid compound in ammonia, straining, washing the residue with water, and desiccation, a brittle tasteless resin remains which is quite insoluble in water, but very soluble in alcohol and hydric ether.

The addition of this sassarubrin to concentrated sulphuric acid, produces the crimson colour already mentioned as resulting from the presence in that liquid of a minute portion of oil of sassafras. I infer that the colour is due to the evolution of sassarubrin, which has a bassic affinity for the acid, to which it owes its birth. The ethereal and alcoholic solutions of sassarubrin are of the colour of a dingy white wine,

but acquire a deep crimson when mingled with concentrated sulphuric acid.

Sassarubrin may be produced by the union of the acid and oil, provided it be moderated by refrigeration or dilution with water.

Without some precaution, the heat produced is sufficient to char the resin more or less. The reddening influence of the oils of cinnamon and cloves is due to the generation of resins analogous to sassarubrin.

To those resins the names of cinnarubrin and clovorubrin may be severally assigned. Cinnarubrin may be evolved by adding oil of cinnamon to equal parts of sulphuric acid and water, previously mixed and refrigerated, the temperature being subsequently elevated till the mass rises up in a foam; when the whole should be poured into a solution of pearlash, from which the resin may be extricated by a strainer. It is analogous to sassarubrin, but it is less efficacious in colouring sulphuric acid, and does not, like the former, impart to the sides of the containing glass a rich red colour. Moreover, it appears to be partially insoluble in alcohol, and to retain sulphuric acid after being boiled with an alkaline solution.

I infer that a new series of resins may be evolved from the essential oils by their reaction with sulphuric acid; which, having a general analogy to each other, may still have discriminating characteristics, arising from the oils whence they may be derived.

ART. XXXVI.—UPON CHERRY LAUREL WATER.

By M. Faury.

In one of the articles in his thesis, M. Mialhe correctly observes that the distilled water of cherry laurel constitutes a medicine extremely variable in its composition, and consequently is a bad medicine. He attributes this variation of constitution to several causes; the first arises, says he, from the circumstance that all operators do not obtain the same quantity of water at one distillation; the second is attributed to the age and period of vegetation, and, doubtless, also to the temperature of the year; the third, and last, is, the greater or less age of the distilled water itself. In consequence of these judicious remarks, M. Mialhe, not being willing to deprive the Materia Medica of an efficient agent, proposes to substitute for the water of the cherry laurel, that of bitter almonds, as this can be procured at all times of the same strength. It appears to me that the causes which have induced M. Mialhe to reject the employment of cherry laurel water, are equally operative with respect to that from bitter almonds, and that this last is affected by others in addition; in fact, do not the pharmaciens, who think they should deviate from the proportions directed by the Codex in the preparation of cherry laurel water, pursue the same course as regards that of bitter almonds? Do not vegetation, temperature of the year, and, I will add, culture, manure, &c., modify the prussic flavour of bitter almonds? Let us join to these, the numerous varieties that these fruits present,—going on to infinity, so that it is the most difficult thing to meet with bitter almonds possessing equal bitterness, almost permitting us to suppose that each tree furnishes a variety, and we will possess reasons sufficient to reject the substitution proposed by M. Mialhe.

Now, since from what has been said, it is clear that the water of bitter almonds, on account of its variable strength, cannot supply the place of that from the cherry laurel in

medicinal practice; and as, on the other hand, we agree with M. Mialhe in condemning the latter, it remains for us to finish our undertaking and designate the substance that can be substituted for it advantageously. We propose, then, the active principle of this compound, that is the volatile oil of cherry laurel. This immediate product, always identical, is easily obtained and can be a long time preserved; it presents likewise the simple and easy means of obtaining a water of cherry laurel always uniform in composition, which can be renewed daily. The same proposition is applicable for the preparation of water of bitter almonds; it will obviate (if adopted) the equally numerous inconveniences, which this article presents in its composition.

To resume. I think with M. Mialhe, that the distilled water of cherry laurel is a medicine which ought, perhaps, to be rejected from the Materia Medica; but as it would be improper to deprive therapeutics of so powerful an agent, that it is necessary to replace it, not with the water of bitter almonds, but by the volatile oil of cherry laurel, in which resides its active principle. By an extension of the substitution and by analogy, I propose the same modification, as regards the employment of distilled water of bitter almonds.*

* We cannot approve either the substitution proposed by M. Mialhe, or that imagined by M. Faury, for the following reasons:—First, With regard to M. Mialhe; before substituting the water of bitter almonds for that of cherry laurel, it is necessary that there should be perfect identity of physiological action in both products, which, at the present day, has not been proved, or, as far as I know, even been tried. As to the reasons given by the same pharmaceutist, for rejecting the water of cherry laurel of the Materia Medica, we do not believe them to be well founded. If some manufacturers do not prepare this water in accordance with prescribed proportions, it is their fault and not that of the medicine, which should not be proscribed for a like cause. In the second place, the period when this preparation should be made is not arbitrary; it is that when the plant has attained its *summum* of growth, from the 15th of June to the 15th of August, and it even appears to us that the cherry laurel presents, in this respect, a much greater latitude than most plants of which divers pharmaceutical preparations are made but once annually. Finally, this distilled water is hardly more subject to alterations than others, when

I am of the opinion of M. Mialhe, relative to the preparation of volatile oils, and I even think that, in certain cases, by retarding the boiling point of the water, a result more advantageous is not obtained, but, moreover, a part of the product must be lost. This appears true, at least in the preparation of the volatile oil of cherry laurel. In effect, this essential oil, although much denser than water, comes over from the very first moment that ebullition takes place, and a much larger quantity is obtained by making good use of the heat.

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ART. XXXVII.—RESEARCHES TO SERVE AS A HISTORY OF SAGO—AND AN EXAMINATION OF THE SUBSTANCE CALLED SAGO OF CAYENNE, OBTAINED FROM THE SAGO PLANT OF MADAGASCAR.* By M. Planche. Read at the Royal Academy of Medicine. Extracted by M. Felix Boudet.

M. Planche has had in view in this memoir, to clear up many points in the history of sago, upon which naturalists and chemists are still of opposite opinions; to deduce from the

proper precautions are taken to guard against them. We have preserved it in a good state, not only from one year to another, but even for two, three, or more years, in very small bottles, well stoppered and placed beyond the ordinary causes of alteration.

Secondly, Relative to the proposition of M. Faury, we do not think that it is possible to substitute for the water of cherry laurel, a solution of the volatile oil in distilled water. This will be reverting to the opinion of Fourcroy, who proposes to substitute in general for the aromatic distilled waters, aqueous solutions of the essential oils, an opinion to which therapeutics, a correct practice of pharmacy, and chemistry itself, have long since done justice.

P. A. C.

* Sagus Poitei.

comparative examination of the different species of sago, characters that can be of service in choosing them; and finally, to fix the attention of pharmacologists upon the substance deposited in the Museum of Natural History in Paris, by M. Poiteau, under the name of *Sago of Cayenne.* The first paragraph is devoted to very interesting details upon the period of the introduction of sago into France and of its consumption, from that time, until the present.

Although pharmacologists generally concede that its introduction dates from 1730, M. Planche regards it as certain, that it was several years before this period, that this feculent matter was known. He is supported in this statement by an autograph letter of the Marechal de Noailles, dated Philisbourg 1734,—in which mention is made of sago which was sent by the Marechal to a lady of Manchy, his relation, recommending it to her as a specific in diseases of the chest.

The first species of sago, or at least, that most anciently known with us, is the sago of the Maldives. It was first designated by the name of China sago; but was soon confounded with that of the Moluccas, and sold as such, when the Dutch, for a long time established at Amboyna, where they had exclusive possession of the commerce in this commodity, thought the moment favourable to put the sago of the Moluccas into circulation.

Still later, other species of sago have been brought from different countries of India and elsewhere, always under the name of Molucca sago, although they differ in many properties which will be indicated when each species comes before us.

The period when sago was most in vogue in France was from 1772 until 1784. From this until 1825 the estimation in which it was held diminished, but to date from 1825 to 1835 exclusively, it has successively increased; which is shown by the following table, the accuracy of which is vouched for by M. Planche.

In 1826 there were imported into France	6.583	kilogrammes.
1827	13.994	
1828	10.545	
1829	14.494	
1830	10.017	
1831	11.404	
Total,	67.039,	

Of which the mean is 11.173. Suddenly in 1832, the year of the cholera, from the influence of Hygienic instructions, which recommended the use of farinaceous articles, the amount increased to 28.588 kilogrammes; in 1833 it diminished to 12.545, to be increased during the following year to 18.725.

The remarkable augmentation just stated in the consumption of sago, from 1826 to 1834, appears to be owing to the introduction into commerce of two new species of sago—the white and the rose-coloured. At first a prejudice existed against the white sago, and upon the faith of the Dictionaire des Sciences Medicales, it was admitted that it had deteriorated; but soon, at the recommendation of M. Planche, the principal commercial houses trading in farinaceous substances, adopted the practice of washing it in cold water, and then drying it by a stove, and this very white sago, in the first instance the most inferior, became the most sought for, and possessed characters equal to that of the rose-coloured.

Description of the different varieties of Sago, of their Origin, of their External Characters, and of their Chemical Properties.

The researches of M. Planche relate to six species of sago, of which he has determined the nature with the most scrupulous exactness, by eliciting all the information attainable upon this subject.

The first comes from the Maldives.

The second from Sumatra.

The third from New Guinea. And

The three last from the Malaccas.

Sago of the Maldives.

This sago, which is still met with in some of the drug houses of Paris, is furnished by a palm of the Island of Malé, the largest and best cultivated of the Maldives. The specimen in the possession of M. Planche was sent to him by Mr. John Miller, a naturalist of Charlestown, who had dwelt many months upon the Malabar coast nearest to this isle. The sago of the Maldives comes to us under the form of rounded or ovoid grains, of considerable hardness, the diameter of which varies from one to five millimetres; some present a uniform colour of dried clay throughout their entire surface; others exhibit this colour on one side only, with a degree of the same tint on the opposite; others in smaller number are almost white. A vessel conveniently adapted to contain 1.000 parts in weight of pure water, when filled with this sago, contained 732 parts.

Placed in maceration during twenty-four hours with ten times as much cold distilled water, 500 grains (twenty-seven grammes) of this same sago absorbed 570 grains of it, and became doubled in volume. Exposure to dry air for some hours was sufficient to restore it to its original volume, hardness and colour; the liquid when filtered was colourless and insipid, without action on litmus, upon the tincture of iodine, upon that of galls, as also upon a solution of nitrate of silver.

The tribasic acetate of lead, produced slight disturbance in it, but the same phenomenon having been observed with distilled water, taken as a means of comparison, this result is entirely negative.*

* The tribasic acetate of lead, in the first instance indicated by Dr. Bostock as proper to detect the presence of amidon, is, according to M. Planche, less sensibly affected than iodine, and demands greater attention on the part of the experimenter. All the treatises upon chemistry assert, that it is not affected by distilled water, that the disturbance is produced only when the water contains carbonic acid or the sulphates. M. Planche has determined, nevertheless, that distilled water, which has no effect upon a solution of barytes or nitrate of silver, or that of bichloride of mercury, produces very perceptible milkiness upon the clearest solution of tribasic acetate of lead, when it is added in large proportion.

If evaporated by a salt water bath, an extract is obtained of a pale yellow colour, in weight equal to $\frac{1}{300}$ of the sago employed, of a slightly saltish taste, and from which alcohol separated a crystal of muriate of soda, but of so small a size, that it is not to be wondered at, that this salt was not detected in the first instance by the nitrate of silver.

Sago of Sumatra.

This sago was sent to M. Planche in 1827, by M. Bussail, surgeon of the navy, who procured it from the localities, upon his voyage round the world, under the orders of M. de Bourgainville. It comes from a palm which grows upon the east coast of Sumatra towards Malacca, where still live some Portuguese families who prepare it by a peculiar process.

The sago of Sumatra occurs in very round grains, from one to two millimetres in diameter, some of them entirely white, others of a dull yellowish white. It exhales a slight odour of musk, which it partly loses by washing in cold water; this odour, however, appears to be foreign to the sago itself, for it is sometimes observed in the rice of Carolina, which has been packed when still moist. Its weight, compared with that of water, was $\frac{684}{1000}$; the quantity of water absorbed by 500 grains was 670 grains, and its volume was more than doubled; the colour after desiccation was a little paler than in the natural state, in other respects it had recovered its properties.

The filtered *maceratum* was colourless, without decided taste, and underwent no modification from reagents, with the exception of the nitrate of silver which produced slight turbidness. The extract obtained weighed four grains, and contained an appreciable amount of muriate of soda. This sago is not found in commerce.

Sago of New Guinea.

M. Planche has received this sago from a relation of General Hogendorp, M. Burvil of Rotterdam, who brought it from New Guinea in 1807. Upon comparing it with that still to be obtained in some of the warehouses of Paris, under the

erroneous name of German sago,* he has satisfied himself that it is perfectly analogous to it; and, moreover, upon comparing its characters with those attributed by M. Lesson to a sago procured from a species of cycas of the Isle of Waigiou, situated to the North West of New Guinea, he thinks that it ought to retain this name. The grains of this sago have the form and volume of that from the Maldives,—but their predominant colour is brick red. Some grains are also to be noticed, which exhibit this colour, with a paler shade of it; others have a dull white tint. This sago is exceedingly difficult to reduce to powder; its weight, compared with that of water, was $\frac{728}{1000}$; 500 grains absorbed 604 of this fluid, and assumed double the volume. Desiccation by the atmosphere restored it to its primitive condition.

The *maceratum* was colourless, inodorous and insipid; it underwent no change from the addition of reagents. One grain and a half of an extract was obtained, which left upon the tongue an impression analogous to that of water distilled from Windsor beans, and contained traces of muriate of soda.

Sago of the Moluccas.

There exist in commerce three species of sago originally from the Moluccas, one called gray, to which druggists exclusively give the name of Molucca sago, while they designate the two other species by the names of rose-coloured and white sago of India.

Gray Sago.

This variety is in rounded grains, but less regular than in the preceding species, from one to three millimetres in diameter, of a pale fawn colour bordering upon gray; it appears to be the same as that which M. Lesson has seen prepared in

* Under the Empire, during the continental war, all the productions from the English and Dutch possessions in India, came to us by way of the Hanse towns, hence the name of German sago, for it is needless to state that sago is not cultivated in Germany.

the Isle of Bouron, one of the Moluccas, from the medulla of the *sagus Rumphii.* According to this naturalist, when the fresh separated fecula of the medulla is agitated with water, it is precipitated under the form of grains of a yellowish white colour. Its weight, compared with that of water by means of a standard vessel, was $\frac{672}{1000}$; 500 grains absorbed 544 of water, very nearly doubling the volume. By desiccation the primitive characters were regained, except the colour, which appeared lighter.

The *maceratum* was not altered by reagents, except the nitrate of silver, which formed a light precipitate with the chloride. The extract weighed three grains and a half; it was of a deep brown colour, slightly deliquescent, and contained more common salt than the others.

Rose-coloured Sago.

This variety is easily recognised by its uniform rosy gray tint, the minuteness of its grains, the largest of which are not more than a millimetre in diameter; it is, moreover, after the sago of New Guinea, the hardest yet examined. Its weight, compared with that of water, was $\frac{716}{1000}$; 500 grains absorbed 652 grains of water, its volume becoming doubled.

Reagents had no effect upon its *maceratum*, which by evaporation was reduced to an extract of a rose tint, taste stale, slightly saline, and in weight three grains. This sago, for several years has been much sought for by consumers, and it has a reputation which it shares with the white, the last that remains for us to study.

White Sago.

M. Planche thinks he can assert, upon the faith of M. Marchand, that this sago really comes from the Moluccas, and further, it appears to him very probable that it is nothing else than the Maputi sago, the whitest and most esteemed in Amboyna,—according to Rumphius and M. Lesson. Its weight, compared with that of water, was $\frac{776}{1000}$, and 500 grains absorbed 820 of this fluid, the volume becoming tripled. After

drying, it presented somewhat a translucent aspect; the *maceratum* had a stale sweetish taste, similar to a very thin solution of starch, without action upon litmus; it assumed a beautiful blue colour upon the addition of tincture of iodine, was rendered slightly turbid by the tincture of galls, and afforded, after some time, a white flocculose precipitate. The tribasic acetate of lead rendered the liquor opalescent, but no precipitate was formed. The extract obtained weighed twelve grains; it was of a dull reddish yellow colour, with the taste of baked starch, slightly saltish. Heated to redness in a platina crucible, it became swollen, giving out thick smoke with the odour of burnt bread, and the ash exhibited traces of muriate of soda, a salt which is found, as may be perceived, in all the varieties of sago.

Here M. Planche gives the reasons which induced him in the treatment of sago, to prefer cold water to hot, and the sago entire to its powder.

"At the period," says he, "when M. Raspail made his beautiful experiments upon the feculæ, three species of sago described in the memoir now published, were not to be found in commerce, viz:—the sago of Sumatra, the white, and the rose-coloured. Of the three other species, one alone was pretty abundant, and from the description given of it by the skilful observer mentioned, this must have been that from the Maldives:—

"M. Raspail experimented upon the sago whole, and employed cold water.

"M. Caventou in his analysis of sago, also employed cold water, but he acted upon this substance in powder. The first likening sago to the other feculæ, supposed the existence of a tegumentary substance insoluble in cold water, serving as an envelope to another contained soluble matter. The second assures us that sago is homogeneous in its composition, and that it is only a variety of starch soluble in cold, but more so in warm water. Evidently, if instead of experimenting as we have done, we had acted upon it in powder, the white

sago would have been confounded with the other species, as regards its chemical properties.

In order to examine sago well, says M. Raspail, it is necessary to allow it to remain in cold water during some hours. If portions of the superficies of the globules are then submitted to the microscope, we are convinced that all the grains of fecula have been broken, for the teguments, torn and gaping, are spread by myriads over the stage. Beneath this superficial layer, the grains, without having been broken, exhibit in their interior, and sometimes upon a point of their surface, a granular arrangement,—a corrugation to be detected upon all the feculæ that have been submitted for a moment to the action of heat, after having been simply moistened or kneeded. In the centre of the globules, on the contrary, there are perceived only whole grains not at all altered.

M. Planche has verified the correctness of the microscopic experiments of M. Raspail upon the sago of the Maldives, but he opposes the conclusions he has deduced from them by the following observations. These granules, which M. Raspail represents to us as torn and gaping, must necessarily yield to the water a quantity, more or less considerable, of the soluble matter they contain. Now M. Planche adverts to the fact that in his own essays, the five first varieties of sago, and especially that of the Maldives, did not yield to cold water the slightest trace of starch after twenty-four hours maceration. The same sago of the Maldives, allowed to remain in water during many months, has afforded a similar negative result, which proves, as he states, that the teguments of the fecula in the sago do not yield to the efforts of the water they enclose, and resist it so thoroughly, on the contrary, that if a grain of sago saturated with water, be divided with a scalpel, the amylaceous granules escape the action of the instrument, and can be agitated with cold water, without their losing the smallest quantity of amidine; whilst if the same humid sago be triturated for some time, the granules burst and yield their soluble parts to cold water, which then exhibits the characteristics of a solution of starch. Besides, the irregularity of

the forms observed by M. Raspail in the feculent grains of sago, is no matter of astonishment, since it is observed also in the fecula of the potato and others.

In another trial, by directing with caution the action of the pestle, M. Planche has been enabled to isolate completely and without rupture the amylaceous granules which constitute sago, which thus reduced mechanically to a state of simplicity assumes the general condition of the feculæ, that is to say, is, like them, insoluble in cold, and soluble in boiling water.

It now remains to inquire into the variable quantities of water absorbed by the first five varieties of sago, and of the increase in bulk which was the consequence. Upon investigating the cause of this anomaly, M. Planche has determined that it is owing to the unequal porosity of the grains of sago belonging to the same species. He made himself certain of this fact, by macerating the sago of the Maldives or that of New Guinea, the grains of which are naturally of various shades, during twenty-four hours in an aqueous solution of cochineal and alum. These grains were then washed with cold water and dried upon their surface with blotting paper. In this state it was easy to observe that the grains which were the palest before maceration, had assumed a bright red tint that did not penetrate deeply, while those most coloured had become of a reddish purple colour throughout. Finally, in those grains in which two shades of colour had appeared, the part where the deepest of these existed, evinced the greatest penetrability to the aqueous solution, for it yielded to the least pressure, while the other retained its consistence and elasticity.

The author has, also, occupied himself with the explanation of the colouring of sago; he thinks that the colour is peculiar to the fecula itself, and resides in its teguments. He has, in fact, observed, that by treating the sago of New Guinea with diluted sulphuric acid assisted by heat, its solution takes place with the assumption of a very slight reddish tint, and appears transparent to the naked eye, but if attentively examined with a glass, small coloured corpuscules are seen suspended in it,

which are transparent and very delicate, which in time are precipitated and are nothing more than the remains of the teguments.

After what has been said it is easy to explain why white sago gives up to cold water a small quantity of amidine; it is because its tegumentary envelope, probably less resisting, more extensible and more permeable than in the other species of sago, permits the cold water to penetrate to the amidine contained in its granules and to issue from them sparingly charged with this principle. Cannot this property, adds M. Planche, be turned to advantage in preparing, at desire, a drink slightly amylaceous from the white sago of the Moluccas, the residue of which already saturated with water, will serve for nourishment?

The memoir is concluded by some reflections upon factitious sago compared with exotic. The German is so friable that it breaks down between the fingers; that of Gentilly near Paris, has almost the hardness of genuine sago; but prepared as they are from the fecula of the potato, both retain a virose taste which betrays their origin, upon a delicate palate they bear the same relation to the rose-coloured and white sago, that the best wine of Suresne does to the wine of Volney.

At the end of the memoir, of which a detailed extract has been presented, M. Planche has appended a note upon the substance extracted by M. Poiteau from the sago plant of Madagascar, cultivated in Cayenne and designated by the name of sago by this naturalist. This substance prepared by M. Poiteau himself, is of a brown colour almost as deep as chocolate, and is composed of grains three or four times larger than a pin's head, irregular, some of them perfectly pure, others in some portions adhering to vegetable fibre. It is obtained by scraping and washing in water the inner white portion of the young plants, then pressing it through linen to separate the liquid from the matter in suspension and drying it in the sun.

M. Planche has examined this pretended sago; and upon a single inspection, it was easy for him to see that it had no analogy with the true sago. In fact, it exhibits a mixture of

ligneous fibres, white and broken, to which adhere small brown masses, that might be taken at first sight for the gum-resin opoponax. When examined with Raspail's microscope with a lens having a focus of four lines, small tubulous bodies are distinguishable, as also others which are alveolous, having in appearance some resemblance to the *sagotiferous medulla of the Cycas circinalis*, but more coloured, and in which the shining aspect of the fecula, so apparent in the latter, is not observed. Volume for volume, the substance obtained by M. Poiteau weighs one-half less than sago. When reduced to powder and treated successively, first by cold water, then by hot, it exhibits, in the first instance, no trace of starch with iodine, and in the second, the atoms are scarcely perceptible. The brown matter analogous to opoponax, when treated with boiling alcohol, yields to it only a small quantity of yellowish insipid substance as soluble in water as in alcohol. When thrown upon coals, it soon inflames and burns of itself slowly, and leaves a small quantity of slightly alkaline ash. Finally, it is affected by several chemical reagents in the same manner as ligneous fibre.

From this examination it follows, that the substance extracted by M. Poiteau from the sago plant of Madagascar, is not true sago.

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ART. XXXVIII.—NOTE UPON COFFEE.—By MM. Robiquet & Boutron. Read at the sitting of the Societe de Pharmacie, February 1, 1837.

There are few organic productions of any importance upon which chemists have not more or less industriously laboured, in the hope of discovering some of those immediate principles to which their most prominent properties are attributable; thus coffee, so generally in use on account of the peculiar and marked influence it possesses over the animal economy, has been, at divers times, the subject of reiterated experiments, but up to the present moment no striking result has been elicited by these efforts, and we have yet to learn if its remarkable action depends upon a peculiar principle, or the whole of its components. It was with the hope of filling up this void, that for the second time we undertook the analysis, determined not to abandon it until our efforts were crowned with some success, but we have calculated upon perseverance beyond our strength; and, at last, we have abandoned the effort which presents nothing satisfactory. At the same time, we have determined to publish our results, imperfect as they are, in order to assist those more skilful and determined than ourselves who may make new attempts, that the same path may not always be trodden, and to lead them, if possible, into a more favourable direction.

Knowing from all that had been written, and from what we had done ourselves, that coffee contained a fatty substance, we were desirous of commencing by extracting it, that greater distinctness might be attained in the subsequent products; and to accomplish it, we had recourse to ether, which removed from the entire grain only a species of very consistent brown wax. If, after treating it at first in this way, the green coffee is pulverized and placed anew in the same menstruum, the tinctures acquire a citrine colour; and leave, upon evaparation, a considerable quantity of a fixed oil of a clear

yellow colour, possessing the taste and smell of green coffee. This oil readily combines with caustic alkalies, and forms a hard soap, becoming coloured reddish brown, in consequence of the reaction of the alkali upon a colouring principle contained in the oil, which becomes developed only by time. The proportion of this oil does not exceed two ounces to the pound; and it is evident, from what has been stated, that it exists in the very interior of the grain, while the exterior surface is simply invested with a layer of vegetable wax. It should be remarked that the ethereal tinctures, last obtained, abstracted with the oil a white substance, which concreted upon evaporation—and which could be separated from the oil by the filter while warm. What remained upon the filter being compressed between bibulous paper and then dissolved in boiling water and refiltered, a fibrous crystallization due to the caffein was obtained by refrigeration.

The filter retained a whitish granular substance, which resisted the action of boiling water; and which, nevertheless, placed upon a plate of platina and heated, was liquified and gave out the smell of fish oil. It also sometimes happened, that we saw in the product of the evaporation of these last ethereal tinctures, a small number of yellow shining minute crystals which emitted, when burned upon a piece of platina, the marked odour of sulphurous acid, and exhibited a blue flame. Coffee, then, contains a small quantity of sulphur.

Desirous of ascertaining whether the odour and taste of green coffee, which the fixed oil manifests, do not depend upon an essential oil that it contains, we boiled a small quantity of it in a distilling apparatus; and we obtained as the product a slightly lactescent water, having a feeble smell of horse-radish.

After having exhausted the coffee with ether, we employed alcohol at different degrees, 40°, 36°, 22°. Each of these vehicles was employed both hot and cold, but not having obtained any result worthy of being cited, we took another quantity of coffee equally exhausted by ether, and we submitted it to three successive decoctions in distilled water. All

the liquids were united and the neutral acetate of lead added in slight excess, and a magma obtained of a beautiful citrine yellow colour, which, when properly washed and suspended in a certain quantity of water, was submitted to a current of sulphuretted hydrogen. When the reaction had been sufficiently prolonged, it was heated to boiling, in order to drive off the excess of gas and then thrown upon a filter. The liquid product was evaporated by means of a salt water bath, to a consistence almost syrupy, then allowed to remain a very long time, and yet no crystallization took place. It is very probable that this product was not pure, for the coffee evidently contained colouring matter, which alkalies rendered more apparent by deepening the shade and causing it to pass often from yellow to green, properties which are found in a marked degree in the product of the precipitate of lead, treated by sulphuretted hydrogen; but this product also contains an acid of some energy, judging by the taste which is very decided. These two principles, viz.: the colouring matter and the acid, are present in the greater number of combinations, so that it is difficult to establish with clearness the distinctive characters of each of them; and doubtless, from this cause, all the chemists who have investigated them up to the present time, have disagreed as to the nature of the acid;—thus, while Cadet regards it as the gallic, Grindel confounds it with the kinic, Payssé makes it a peculiar acid, and Pfaff considers it as the cause of the aromatic odour of burnt coffee, which we may remark, *en passant*, appears to us to be very far from the truth, for we have observed nothing that can support this opinion. We would be more disposed to look upon it as the gallic acid, with Cadet, on account of its action upon the persalts of iron, for which it is really a very sensible reagent. We conceive that in order to give a positive opinion with regard to it, it is necessary to separate it from the colouring matter; but this product does not possess sufficient interest to induce us to seek the means of overcoming this difficulty.

To give connexion to our experiments, we took the decoction from which the acid and colouring matter had been

separated by the acetate of lead, and caused to pass through it a current of hydro-sulphuric acid to decompose the excess of acetate. This liquid being heated and filtered, was finally evaporated to the consistence of an extract. This extract re-dissolved in alcohol, furnished two different products, one soluble in this vehicle and which yielded, upon evaporation, an abundant crystallization of caffein; the other soluble in water, left only extractive matter, tumefying by heat and giving off, when torrefied, an odour more analogous to that of burnt coffee, than any other product having the same origin—but yet far from identical with it.

We pass rapidly over these facts, because none of them being capable of facilitating the solution of the problem sought for, it would be useless to insist upon them further.

We have tried other measures in addition, but without greater success; these we shall mention for the benefit of our successors. It has been supposed that torrefaction developes new principles, and it has often been asserted that an essential oil is driven over by heat, the true source of the odour of coffee. To be assured of this, we constructed a small condensing apparatus, composed of two matrasses fitted to each other, one the roaster, the other the receiver and condenser. It was believed, from the arrangement we had made, that no product of torrefaction could escape, and yet only a small quantity of pure water, in the first instance, came over, then acetic acid coloured with a litle oil having an agreeable taste, but very sensibly empyreumatic, although the coffee had not attained the requisite degree of charring. Such were the only volatile products we obtained, water, acetic acid, and empyreumatic oil. In fact, this oil, when in very small amount, has an agreeable odour, and the acetic acid accompanying it, contributes not a little to bestow greater diffusibility upon it. It may, perhaps, be recollected that one of us has proved that acetic acid serves as an odoriferous vehicle to many perfumes.

To return to our operation, we ought to add that the longer this torrefaction is prolonged, the more the acetic acid becomes

concentrated and the more the empyreumatic oil becomes acrid and disagreeable, and that at last a fourth product is added to the preceding; this consists of long filiments which attach themselves to the sides less heated; a little warm water easily removes them, and the filtered solution, upon evaporation, yields crystals of caffein. It is, probably, on this account that some have thought that benzoic acid was disengaged during torrefaction. M. Labillardiere, an old member of the Academy, has informed one of us that he has collected these crystals by means of a cone of paper placed over burning coffee. We have repeated this experiment by substituting a glass vessel for the paper cone, and we have noticed it covered with long delicate arborizations presenting the characters of caffein.

Not having gained any thing by this procedure, we directed our researches to roasted coffee, for here at least, thought we, it is very certain that the active principle must be found developed,—since it is prepared thus that it produces so great an effect upon the animal economy. But all our efforts were useless; the burnt coffee preserved its secret as completely as the green. It is true, however, that ether separated from it an abundant brown fixed oil highly charged with its aromatic principle, but nothing could isolate the latter; thus it was boiled in vain with water in a distilling apparatus; no product could be obtained representative of the taste or smell, and still less of the properties of coffee. It would appear then, that this principle is fixed, or at least, that it remains adherent to the oil; which, moreover, undergoes but little alteration by this slight torrefaction.

It remains for us to state, in order to complete the table of failures, that the presumed presence of gallic acid has induced us to try the method by fermentation upon green coffee, and we have thus been enabled to determine a species of putrefaction in this grain. Coffee becomes very white after being macerated some days, the water acquires a high degree of colour and a viscid consistence, and, if submitted to evaporation, an extract is made, which re-dissolved by alcohol, affords

a notable quantity of caffein. During the first days of maceration, the odour of horse-radish is perceptible, but little by little this odour becomes more disagreeable and finally stercoraceously fetid.

The only striking facts resulting from this resumption are, that fine green Martinique coffee, the only kind upon which we experimented, contains about one-eighth of its weight of fixed oil, and that after torrefaction this oil is charged with an aromatic principle, and even with the taste of burnt coffee; that, moreover, caffein is found in all the products of coffee, whatever mode of treatment it is made to undergo. This, then, is a principle that must be regarded as little alterable,—since it resists the destructive action of fermentation and the elevated temperature of torrefaction. We have suspended it in water, and it has thus remained for many months exposed to the atmosphere, without appearing to have undergone the least alteration.

We would be induced, in the meantime, to attribute to this product the essential properties of coffee, for it alone, of all, presents some characters a little striking; and the circumstance is remarkable, that it not only contains azote like the greater number of active vegetable principles, but like them, it forms an insoluble compound with tannin. We have even taken advantage of this property to extract caffein, as has been done by M. Henry Jr., with respect to some alkaloids. Thus we took 500 grammes of coffee slightly torrefied, only sufficiently so to render it readily powdered. We next boiled this powder twice in two litres of water at a time, and during twenty minutes. These decoctions, after being strained, reddened litmus; they were saturated by some drops of the solution of caustic soda, and a strong decoction of galls was poured into them. An abundant precipitate resulted, which sometimes was curdled and easily subsided to the bottom of the vessel, and sometimes remained suspended in the liquid. In this last case, it is necessary to take care to consult the state of saturation of the liquid; and to add, as required, either a little caustic soda, or diluted sulphuric acid, so as to produce

coagulation of the precipitate. When this had been obtained, the whole was cast upon a thick cloth. When the precipitate was well drained, it was triturated in a marble mortar with fifty grammes of lime, the air being excluded, and it was then boiled twice over in six decilitres of alcohol at 33°. The alcohol, filtered while boiling, was submitted to distillation so as to drive off $\frac{5}{6}$ of its volume, and the remainder poured into a capsule and evaporated by a slow heat. Upon cooling, palmate crystals were obtained of a greenish colour, more or less deep, but which entirely disappeared upon solution and crystallization anew.

The principal varieties of coffee submitted to this treatment furnished us the following results for 500 grammes of each:—

		Grammes.	Grains.
Martinique coffee,	caffein,	1.79	32
Alexandria "	"	1.26	22
Java "	"	1.26	22
Moka "	"	1.06	20
Cayenne "	"	1.00	19
St. Domingo "	"	85	16.

We ought to remark, in conclusion, that we have not been enabled to extract from coffee the concrete volatile oil, which is supposed to exist in it, and we will add, relatively to the solid fixed oil having the smell of cocoa, spoken of as one of its products,—that it must exist in very small proportion, but that the principal oil met with is the fluid fixed oil, a little coloured in the first instance, but becoming brown from age. We may state, finally, that the major part of the acid which is isolated by the acetate of lead, is combined in the coffee with lime, and very probably it is not the same as the free acid which we believe to be the gallic. It is very certain that when the decoction of coffee is treated by acetate of lead, in order to separate the acid and the colouring matter, if the excess of lead be precipitated by sulphuric acid, and then evaporated, a considerable quantity of sulphate of lime is obtained, which is sometimes taken for crystals of caffein.

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ART. XXXIX.—NOTE UPON THE PREPARATION OF IODINE AND BROMINE. By M. Bussy.

The method of obtaining iodine generally followed, which consists in decomposing the mother waters of barilla by means of concentrated sulphuric acid, as has been a long time known, is liable to give very variable results, in consequence of a portion of iodine often passing off by volatilization, either in the state of hydriodic acid, or in that of chloride of iodine; and in either case there always results a notable loss in the quantity of the product.

To remedy this inconvenience, M. Soubeiran had proposed to precipitate the iodine of the mother waters by means of sulphate of copper, and afterwards to decompose the iodide of copper by peroxide of manganese at an elevated temperature.* But this process demands minute attention and many precautions when it is attempted to obtain the whole of the iodine that exist in the mother waters, and we do not believe that it has ever been followed in any manufactory. These reasons have induced us to make known a mode of proceeding much more simple, which has been employed lately by the manufacturers of iodine. It was discovered (if we are correctly informed) by M. Barruel, superintendent of the chemical works of the faculty of medicine; it consists in precipitating the iodine of the mother waters of barilla by means of a stream of chlorine. In order to do this, the mother waters are evaporated to dryness, to the residue of the evaporation a tenth of its weight of peroxide of manganese in powder is added, the two are intimately mixed and the combination heated to a commencing red heat in an iron boiler, agitating it frequently. This calcination has for its object the conversion of the sulphurets, and hyposulphites which are in great abundance in

* Journal de Pharmacie, t. xiii., p. 427.

the mother waters, to the state of sulphates. It is very easy to understand that these compounds are transformed into sulphates by taking a small quantity of the calcined matter, and pouring upon it sulphuric acid in excess. It ought not to give rise either to disengagement of sulphuretted hydrogen or a deposition of sulphur when the transformation is complete.

If, during calcination, violet fumes are disengaged, it is necessary to moderate the action of the heat in order to avoid the loss of the iodine.

When the sulphurets are entirely decomposed, the residue is dissolved in a sufficient quantity of water to obtain a solution at 36° of the areometer.

Into this solution a current of chlorine gas is made to pass, taking care to agitate it continually with a glass rod; the liquid becomes deeply coloured, then turbid, and allows the iodine to deposit under the form of a black powder; it is collected and distilled in a glass retort, in order to obtain it in the crystallized state, as it is found in commerce. The only difficulty which this preparation presents, is that of properly seizing the point when the action of the chlorine should be arrested, so as not to make it pass in excess and re-act upon the precipitated iodine. This excess of chlorine is to be especially guarded against, when it is desirable to extract from the same mother waters the bromine they contain. It is requisite in order to avoid adding an excess of chlorine, to allow the liquid to settle when it is supposed to have reached the point of saturation, to withdraw the current of chlorine, and direct the gas upon the surface of the liquid; for as long as the iodide is held in solution, a pellicle of iodine will be seen to form upon it, which effect no longer takes place when all the iodine is precipitated; in this last case the liquid becomes clear rapidly, and only retains a slight reddish tint.

The extraction of bromine, which is ordinarily practised, also presents great difficulties which can be avoided by the following method:

This method is very analogous to the preceding. It is, like it, based upon the elective affinity of chlorine, and upon the

property which this possesses of displacing bromine from its combinations. It, moreover, permits a useful application of the mother waters of iodine, which hitherto were valueless. The mother waters of barilla, after the iodine has been precipitated by chlorine as has been described, contain bromine in the state of a metallic bromide, when care is taken not to add more chlorine than is rigorously required to precipitate all the iodine. There are added, to one thousand two hundred and fifty parts of these mother waters, thirty-two parts of peroxide of manganese in powder, and twenty-four of sulphuric acid at 66°. The whole is poured into a tubulated glass retort to which is adapted a tubulated globe receiver, and to this last a tube which communicates with a proof glass. The retort and globe, as also the globe and the tube, should be so exactly fitted to each other as to admit of its adaption without lute or stuffing, which would inevitably be destroyed by the action of the chlorine. All being thus arranged, the retort is heated, so as to cause the liquid to boil; the bromine condenses in the globe under the form of red oily striæ with a small quantity of water; the operation is interrupted when red vapour ceases to come over.

By gently heating the globe without displacing the apparatus, the bromine is driven over into the proof glass, where upon cooling it will be condensed.

The mother waters which have been employed in this preparation, are to be rejected, when it is ascertained that they contain no more bromine by the addition of a new quantity of sulphuric acid and oxide of manganese.

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ART. XL.—CHEMICO-LEGAL RESEARCHES, TO DETERMINE THE PRESENCE OF VERY SMALL QUANTITIES OF HYDROCYANIC ACID—EITHER FREE OR COMBINED.

By M. Ossian Henry.

When researches are instituted having *legal chemistry* as their object, the slightest modifications ought to be published which can render processes in use more precise and certain in their execution; with this motive I have determined to present those which I have made, in order to appreciate with exactness the *very minute quantities of hydrocyanic acid, free or combined*, contained in different products. Having had occasion to inquire into the existence of *hydrocyanic acid*, I have been induced to believe that of all the methods published, either recently or long since, that most advantageous beyond doubt, for the purpose of fixing and seizing this principle, consists either in precipitating it directly by the nitrate of silver, or in volatilizing it by distillation; or after having eliminated it from its compounds, receiving the volatile product in a weak solution of this salt very pure. The hydrocyanic decomposes this last and gives origin to a white curdled deposit of considerable amount insoluble in water, and in weak nitric acid, and which consists of *cyanuret of silver.**

* A liquid containing hydrocyanic acid (prepared recently by the method of *Gea Pessina*) was separated into two equal parts A. and B. The first, A., furnished by distillation *dry cyanuret of silver* 3.10. The second B., by direct precipitation *dry cyanuret of silver* 3.00 in weight, almost the same.

This experiment is at variance with that obtained under circumstances almost similar, where the quantity obtained by distillation was found in the least proportion, probably on account of the transformation of the prussic acid into formic. I think that the proportion of water to the prussic acid was, in this case, so small, that the latter was enabled to disengage itself promptly without undergoing any action on the part of

This cyanuret is not easily affected by light, for I have left it in the experiment glass and under water exposed during three months to ordinary light, and although it had assumed a grayish violet tint, it retained all its properties.

The hydrocyanic acid being once fixed in this way by an insoluble combination, the volume of which permits the detection of the smallest quantities; there are, then, many methods of proving really the presence of this acid, either by treating it with muriatic acid, which disengages the *odour of bitter almonds*, or by transforming it by means of corrosive sublimate into a cyanuret of mercury, crystallizing in beautiful prisms and soluble in water, &c. These proofs are unquestionably easy to obtain when sufficiently notable proportions are procured, but the same is not the case when these proportions are very minute. I believe that under such circumstances the prussic smell is too feeble, and of too short duration, to be perceived certainly by our senses; besides, the formation of the cyanuret of mercury presents other difficulties. To obviate this inconvenience, I have thought that reactions capable of producing *prussian blue* or *red ferrocyanate of copper*, offered a great advantage. M. Lassaigne had already presented a method which detected traces of hydrocyanic acid in a liquid, but as this method did not always furnish decided reactions, I have endeavoured to substitute for it another process,—which appears to me to conduct to a result more determined. It consists in transforming in a few moments, and without difficulty, the cyanuret of silver into a soluble ferrocyanate, which can give *blue or reddish brown* precipitates with the salts of iron at a *maximum*, and with those of copper.

It was necessary, before putting this method or modification into operation, to be certain of the sensibility of the reagent employed, and I have done this in the following manner:—

0 gr. 1 decigramme of ferrocyanate of potassa was dissolved

the other liquid. But when the quantity of water is considerable, the degree of volatility of the organic compound is so diminished as to be easily modified by the water and heat.

in twenty grammes of pure water. I then took two grammes of this solution and added them to 198 grammes of pure water. The whole liquid then represented $\frac{1}{20,000}$ of ferrocyanate of potassa. This liquid, treated by the muriate of the peroxide of iron, afforded a very deep blue colour, and a little after, a deposit of prussian blue which settled to the bottom of the vessel. This blue colouring was even very perceptible when the liquid contained only the $\frac{1}{40,000}$ of the same salt of potassa.

With the sulphate of copper the reddish brown tint appeared in a very distinct manner, in the first solution of $\frac{1}{20,000}$.* I still was desirous of being convinced of the possibility of isolating, by the salt of silver, extremely minute proportions of *hydrocyanic or prussic acid.* For this purpose I made the following solutions:—0 gr., 1 decigramme of cyanuret of potassium was thrown into twenty grammes of distilled water, this solution formed an abundant reddish brown precipitate with the permuriate of iron. Two grammes of this liquid were then added to 198 of water. There resulted a product of $\frac{1}{20,000}$, in which the weakest solution of nitrate of silver formed a light flocculent deposit, capable of being collected after it had settled in a narrow vessel. I obtained in the same manner, a similar deposit with a liquid of $\frac{1}{40,000}$; and both the deposits, placed upon test glasses and treated in the way which will be mentioned directly, afforded a very appreciable amount of prussian blue, the presence of which could not be questioned.

Upon the strength of these experiments, since they had been made upon the smallest scale, I endeavoured to detect hydrocyanic acid in complex liquids, as wine, broth, fermented products, urine, and fluids obtained from the intestines and

* I wished to prove at the same time the sensibility of sulphocyanuret of potassium by salts of the peroxide of iron. A liquid containing $\frac{1}{20,000}$ of this salt, gave me, with the muriate at a *maximum*, a pretty intense red tint and with the $\frac{1}{30,000}$, but with the $\frac{1}{40,000}$ scarcely the tint of onion peel. With the sulphate of copper and a deoxygenizing body with the $\frac{1}{20,000}$ there appeared a whitish cloudiness.

stomach of dead bodies, to which I purposely added small quantities; I even allowed these mixtures to remain several months, (the vessels in which they were contained being well stopped,) and by my method sought for the presence of the poisonous acid I had added. In every case I was so fortunate as to find it in appreciable quantities, even after four and five months. I had, in truth, made use, in these experiments, of the prussic acid prepared according to the plan of *Gea Pessina*, (see *Journal de Pharmacie* t. xvii., p. 315, and *Traité de Pharmacie* by M. Soubeiran,) which is now known to be capable of preservation during a long time without undergoing alteration,* which is not the case generally with the same acid obtained by other processes, for its existence is but ephemeral.†

I also took animal matter from bodies which had been allowed to remain a long time in a state of putrefaction and endeavoured to determine if *hydrocyanate of ammonia, or of any other alkali* had been formed, but without success. I do not wish to infer, however, that this salt cannot be formed in decompositions of this kind; I pretend solely to demonstrate that that which I detected in the preceding mixtures was the acid purposely added by myself some time before.

Finally. I gave to three frogs of large size, several drops of hydrocyanic acid a little diluted; when these animals were dead (which occurred in about a quarter of an hour) I allowed them to remain untouched for two, four, and eight days, when I divided them into pieces and distilled them with pure water; the volatile product, when received by a very weak

* I now possess a bottle half filled, which has been prepared for five months; it is as colourless as upon the first day, and has the same strength, odour, &c.

† The method of *Gea Pessina*, an apothecary of Milan, is the following:—Take of the ferrocyanate of potassa, 180 grammes; sulphuric acid, at 66°, ninety grammes; water 120 grammes; add the water to the sulphuric acid, and the mixture thus formed to the ferrocyanate of potassa in a tubulated retort, to which a globular receiver is adapted, the latter is to be surrounded with ice and in it the acid is condensed with an excess of water.

solution of nitrate of silver, afforded in all three instances a light gray powder, in which the existence of hydrocyanic acid was more decidedly proved by the method I shall now indicate.

Process for appreciating very minute quantities of hydrocyanic acid, free or combined.

When a liquid, or any product whatever, is supposed to contain hydrocyanic acid, either in a free state, or in combination with a base, it is necessary either to precipitate it at once by a weak solution of nitrate of silver, or if the liquid is coloured and mixed with foreign salts, to distil it in a glass vessel well adapted for the purpose, adding water only in the first instance, or acidulated with muriatic in the second, the compound being a little concentrated before hand; the volatile product is received into a solution of nitrate of silver very much diluted, and soon forms a turbid white precipitate which subsides to the bottom of the vessel; when the disengagement no longer produces any cloudiness in the solution, the operation is to be arrested and the precipitate separated. This is washed in distilled water, when it is collected carefully in order to be moderately heated with one-half its weight of common salt ;* it is then allowed to cool and filtered; sometimes the liquid is a little cloudy from the presence of a small quantity of alkaline cyanuret, which dissolves the chloride of silver. To the filtered product is added a small quantity of *hydrated oxide of iron*, (made by precipitating the protosulphate of iron in solution by potassa,) which is greenish, being a mixture of protoxide and peroxide; it is filtered again after being moderately heated, and the least traces of *ferrocyanate of soda* being present (a salt which is produced in the preceding reactions) arising from the original prussic acid; a blue colour is obtained by the addition of a few drops of a solution of the muriate or sulphate of the peroxide of iron. After a few hours this colouring disappears and gives place to

* For this salt may be substituted, either muriate of potassa, or muriate of lime, or magnesia.

a light deposit of prussian blue (when the product is rich in ferrocyanate, the blue deposit is very abundant.)

The deutosulphate of copper also added to a part of the above liquid, forms a chesnut brown precipitate, or only produces a reddish tint which gradually gives place to a light precipitate.

ADDITION.

I have also succeeded in transforming cyanuret of silver into sulphocyanuret, which furnishes an accessory proof. The following process has been followed: the cyanuret was mixed with one-half its weight of washed sulphur, then heated in a small tube of glass, until fusion took place, (which was pretty rapid). The residue, when triturated, was treated with a solution of common salt, and then filtered; it gave

1. A more or less decided *crimson red colour* with the *muriate of the peroxide of iron.*

2. A whitish deposit, with the deutosulphate of copper when a little protosulphate of iron was added.

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ART. XLI.—PREPARATION OF CARBURET OF SULPHUR.

By G. F. Muller, Lecturer in the School of Medicine at Rotterdam.

By the side of the orifice cut in an iron bottle make another similar opening. Into the first fit a copper tube having a diameter of 0m. 01., curved twice at a right angle; into the second is introduced a straight tube, having the same diameter. The bottle is filled with pieces of charcoal recently reddened and of suitable size, so as to pass through the tube. After the tubes are adapted, the bottle is placed in a furnace and heated, after having surrounded it by a stone cut in two, so as not to be too much inconvenienced by the ascending heat. To the curved copper tube is attached a Woulf's apparatus half filled with water and surrounded with a frigorific mixture, and when the bottle is properly heated, fragments of sulphur are introduced through the straight tube, into which a stopper is immediately placed. The sulphur melts, descends, penetrates the fragments of charcoal, and when the sulphur is added a little at a time, a small amount of gas is obtained and much carburet of sulphur. In this way I have obtained repeatedly, a considerable quantity of carburet of sulphur.

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ART. XLII.—UPON THE RED AND WHITE OXIDE OF PHOSPHORUS.—By G. F. Muller, Lecturer in the School of Medicine of Rotterdam.

Pelouze takes the white crusting upon old sticks of phosphorus for a hydrate, and H. Rose does not consider it different from ordinary phosphorus, but in consequence of its state of aggregation. The red powder which sometimes invests phosphorus is prepared by exposing this substance in warm water to a current of oxygen gas, in which operation the phosphorus unites with this gas, emitting light and developing heat. It is hence stated that the red powder is an oxide.

Some years since I received several cylinders of phosphorus which had been kept thirty years in an open bottle exposed to the light. Their surface was entirely white and covered with a layer of white substance about a millimetre in thickness. I placed these cylinders in another bottle filled with pure distilled water, and it was not without surprise that, upon the following day I beheld them changed entirely to a red; and although it is now four years since they have been in contact with the light, they still retain the same beautiful red colour.

This observation is opposed to the opinion of Pelouze and that of Rose. The only idea I can form of this sudden change of the white crust of phosphorus into red oxide by distilled water, is that the small quantity of oxygen in the distilled water must have changed the white coating into an oxide, and since this quantity of oxygen is very small, the white substance cannot be an oxide. I presume that the phosphuretted hydrogen always formed by phosphorus in water may be the cause of it. In order to determine this, I passed a current of phosphuretted hydrogen gas through water containing red oxide of phosphorus in a state of extreme division. By this operation the red oxide was by little and little reduced to the white substance, which, in its turn, was changed after some days to

the red oxide, by shaking it without the contact of light, with fresh water in which was contained oxygen.

From this it is evident that the white incrustation of phosphorus is a combination of *phosphuretted hydrogen* and of red oxide of phosphorus, and that there is but one oxide of phosphorus, which is red.

In keeping phosphorus under water, it becomes decomposed, forms oxide of phosphorus and phosphuretted hydrogen, part of which combines with the oxide of phosphorus, and gives rise to the white substance mentioned.

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ART. XLIII.—UPON THE ANIMAL OIL OF DIPPEL.—By M. KLAUER, pharmacien at Mulhausen. Extracted by M. VOGEL.

THERE are a great number of pharmaceutic preparations formerly much employed, which have at the present time fallen into complete discredit, or at least, are less in use. Should we not, for some of them at least, attribute the cause of this to the pretended rational modifications which the preparation of them indicated by their authors has undergone, and which has changed them in nature and medical properties. This observation alreadily verified as regards the spirit of mindererus, is especially applicable to the animal oil of Dippel, upon the composition of which modern chemistry has thrown so much new and unexpected light. The older authors say that this oil has a sweet smell, and an agreeable taste; the same certainly cannot be said of our volatile animal oil, which has an extremely disagreeable taste and smell. What can be the cause of this difference? The first idea which naturally presented itself to M. Klauer, was to search for the method of

preparation employed by M. Dippel and the older physicians. He has found that Dippel obtained this oil by distilling animal oil without addition, until a black residuum no longer remained, so that he submitted it to five distillations at least. This process was successively modified in some points by Frederic Hoffman and George Model. Still later, it has been directed to agitate the black oil of hartshorn with warm water to separate the supernatant oil from the aqueous solution which contains the major part of the ammoniacal salts contained in the oil, and to distil this until it commences to pass over of a yellow colour; and finally to distil it alone until it leaves no more residue. The author repeated the process of Dippel upon a volatile animal oil which had already a clear yellow colour. Successive distillations were practised in a retort, by means of a salt water bath; the black residue diminished gradually, and it was only after being repeated four times that it disappeared entirely. The product of the fourth rectification was then as clear as water, its refrigerant power was considerable, it had the agreeable smell of cinnamon, and a burning taste—afterwards sweet, which recalled that of good cinnamon and pepper; yet if preserved any length of time, even in a dark place, it recommenced to become yellow. The specific gravity of this oil was = 0.865. Rubbed with caustic potassa, it gave rise to the disengagement of ammonia when aided by heat.

The result of this experiment accords with the last researches of M. Reichenbach, upon the products of dry distillation of organic bodies. This skilful chemist has demonstrated, in fact, that all sorts of pitch, and consequently the oil of hartshorn also, afford eupione, creosote, capnomore, picamare, ammonia, acetic acid, &c. But by the successive rectifications of animal oil, the greater part of the substances little volatile, such as creosote, picamare, capnomore, as well as the peculiar principle easily oxydized, remain by little and little in the retort, whilst in the product of the distillation, eupione ought to be found in combination with a certain quantity of picamare and of capnomore, of which it is difficult

to free it. From the properties of the three last substances in a pure state, it results that the peppery taste comes from the picamare, the agreeable aromatic odour from the capnomore, whilst the cupione, inodorous and insipid, must be regarded as their solvent; but it is the union of these three substances which constitutes the agreeable odour and aromatic taste of the true animal oil of Dippel. Ulterior researches have taught the author, that the best method of freeing it from the principle easily oxydized which it still contains, consists in not collecting more than the sixth part of the oil employed, and to rectify it alone. Besides the substances which have been mentioned, the animal oil of Dippel must also necessarily contain ammoniacal salts, since, during the whole course of the experiment, nothing was employed to eliminate them.

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ART. XLIV.—VOLATILE OIL OF SOME SPECIES OF MELALEUCA, CULTIVATED IN THE BOTANIC GARDEN OF IENA. CONCLUSIONS UPON THE GREEN COLOUR OF THE OIL OF CAJEPUT. By Carl Stickel, of Iena. Extracted by M. Vallet.

There exist among the learned, two different opinions as to the cause of the green colour of the essential oil of cajeput. Some attribute it entirely to the presence of copper; others think that this oil, in its state of purity, of itself possesses a green colour. We will cite among the last MM. Berzelius, and Reinwardt who obtained at Amboina a green oil of cajeput, Nees d'Esembeck, Martius, Leverkohn, Pfaff, and Caventou. A third intermediate opinion may be admitted, which recon-

ciles the two first, and this is the one confirmed by the experiments of the author. In fact the distillation of the leaves of *Melaleuca hypericifolia* and *splendens*, cultivated successfully in the botanic garden of Iena, afforded him an oil exactly like that of the shops as to smell and taste, of a green colour, but paler than that found in commerce. He thinks, then, that the natural pale green colour of this oil can only acquire the intensity of the green colour of the commercial article, by the presence of copper, which he has detected in the latter.*

M. Stickel terminates his notice by the following reflections:—

1. Most probably in the islands of the Indian Archipelago' where cajeput oil is prepared upon a large scale, the Melaleuca leucadendron and cajeputi, or according to the latest researches, the Melaleuca trinervis, (Hamilton,) are not only employed, but also many other species appertaining to the genus Melaleuca, since the M. hypericifolia and splendens furnished to him an oil, which—as regards smell and taste—does not differ from the officinal cajeput oil.

2. The leaves of the species of Melaleuca are the parts of the plants most rich in essential oil. The stems, on the contrary, are entirely insipid, while the seeds have a camphoraceous and burning taste.

3. With time, the green colour of the oil of the species of Melaleuca becomes yellow. One year was sufficient to produce this change in that in the possession of the author.

4. Perhaps it might be advantageous to cultivate these plants for medical purposes, in the temperate countries of Europe, where the temperature does not fall below + 3° to 4° Reaumur (a temperature in which the plants thrive well in the open ground.)

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* These results are perfectly in accordance with those obtained by M. Guibourt, and which are stated in his *Histoire abregée des Drogues Simples.*

ART. XLV.—REVIEW OF THE "REPORT FROM THE SELECT COMMITTEE ON MEDICAL EDUCATION, WITH THE MINUTES OF EVIDENCE AND APPENDIX. Part III. Society of Apothecaries, London. Ordered by the House of Commons to be Printed, 13th of August, 1834."

(Concluded from page 171.*)*

*Supply of drugs.** Both by their Charter and the Act, the Society of Apothecaries were constituted a trading company, and this privilege seems to have been conferred upon them, in order that a supply of pure drugs and preparations might be secured for the public. Much has been spoken and written regarding the superior management of the pharmaceutical department at the Hall; and two chemists are employed to superintend the processes. It would appear, however, that not only do they supply themselves from British manufacturers with various substances of a bulky nature, but that they even decline preparing those articles which, from their cost and composition, are liable to be adulterated, and which it is of the highest consequence,—both to the safety of the patient and the credit of the practitioner,—to have in the purest form possible.

Mr. Field, the Treasurer, who describes his duty to be a general superintendence of the pharmaceutical department, states that the Apothecaries' Company does not prepare nitric, sulphuric, tartaric, and citric acids, which, it is well known, are not made by the manufacturer according to the processes

* The two divisions of the review devoted to the *Education of Candidates* and *Examiners and Examinations* have been omitted, as they embrace subjects more intimately connected with the practice of medicine, &c., than pharmacy, and involve a question of superiority between the English and Scotch schools, matters for which our pages are not sufficiently numerous.

of the Pharmacopœia, and are not in a state of perfect purity. The following quotation will show how far Mr. Field is qualified to take a general superintendence of the drugs and preparations vended at the Hall. It is also another specimen of the inconsistency and contradiction displayed by all the witnesses of the Apothecaries' Company.

"Does your Society purchase any of the articles that it sells from the wholesale druggists? From the wholesale druggists, certainly. Does your Society purchase of the chemical manufacturers those chemical articles, only, which are prepared wholesale by them as articles of general commerce: does it not purchase any preparations of a different description from the chemists? I believe not. How does it provide itself with sulphate of quinine? It all comes from France; it is all manufactured in a wholesale way by the manufacturers of certain articles. How do you account for its being all prepared in France? They prepare it better and cheaper than we can here. Is it the cheapness of alcohol in France that occasions the preparation of the salts of quinine in that country? This is one important cause: I have no doubt but the French are very clever in manufacturing, and they get a better produce from the same thing than we do. Is there not equal chemical knowledge on the part of many individuals in England? They have so large a practice in it, and they have a skill which moderate practitioners have not. Is not sulphate of quinine subject to considerable duty on import? About a penny an ounce, which is merely nominal. What is the wholesale price of sulphate of quinine? About six or seven shillings an ounce. I recollect it as high as thirty shillings.

"Robert Christison, Esq., M.D., Professor of Materia Medica in the University of Edinburgh called in and examined. Is alcohol used in France for preparing sulphate of quinine? I think not, because more than one process has been contrived by the French chemists for preparing it without alcohol. The processes without alcohol are the cheapest?

Yes, and I have reason to believe that some of the processes without alcohol are followed by manufacturing chemists in this country. Can you give any reason why sulphate of quinine should not be manufactured with profit in this country? I am inclined to believe that a large portion of what is used in this country is made in Britain, though not made as cheaply as in France. There may be various reasons for that; among the rest, efficient workmen in that country are cheaper, and a certain degree of chemical knowledge is far more common. I have examined samples from each country with great care, and have found samples manufactured in England equal to the finest sulphate of quinine I ever saw. Have you met with any sulphate of quinine not of the requisite purity? Several times; I know a chemist in Edinburgh who prefers the British sulphate of quinine, because there is a greater certainty of having it pure; for though it is better prepared in France, it is more irregular."

Henry Field, Esq., further examined:—"How does it happen that your Society, possessing a laboratory and complete establishment, such as would be required for manufacfacturing sulphate of quinine, is not able to manufacture it as cheap as they can purchase it? I believe it is owing to the quantity made in France being much greater than can profitably be made here. The English makers do not make it now so cheap as the French. The fact is, that our laboratory would not be equal to the manufacture of a thing of that kind: it requires an apparatus peculiar of itself, of a very expensive description. Is not the process of manufacturing sulphate of quinine one of those refined processes which, especially your society ought to carry on in their own laboratory; in as much as it is an article not manufactured to any extent by the wholesale chemical manufacturer, is very liable to adulteration, and is inefficacious, except in a state of purity? There are not more than two or three manufacturers in England, I believe, who prepare it. Is not that an additional reason why your Society should do so? We attempted it

once, I believe, upon its first discovery; but the difficulties of making it are so great, that the manufacturers of it can do it much cheaper than we can. Do you mean to say, that there is not sufficient skill at your laboratory to prepare this substance with advantage? I am not speaking of skill, exactly; but in France the quantity to be prepared is so large that they can do it better and cheaper than we can. The article prepared in England is not very saleable; for it differs so much in appearance from the French, that the public in general is not satisfied with it. What are the principal articles that are prepared at your laboratory? It is almost impossible to state, there are so many; almost all galenicals or compound medicines, syrups, and pills and a great many chemicals. Do you grind all the drugs yourselves? Yes. Are your preparations better or worse than those which are sold by the most respectable chemists and druggists? They certainly are greatly better than what are sold by chemists and druggists in general: but there are a few persons in London who might be named, and who sell very excellent medicines, and I dare say, as good as ours. We are governed by the pharmacopœia, and in galenicals consider ourselves obliged to make use of every ingredient therein mentioned."

Mr. Field immediately after states, that the processes of the pharmacopœia are not followed in all cases, but that deviations are made whenever it is deemed necessary. Dr. Christison, perhaps the first pharmaceutical chemist of the day, asserts that the French quinine cannot be depended on; but the Worshipful Company refuses to manufacture this substance, or even to vend the British; because, forsooth, the public would rather have it of the French shade of colour. Such are the guardians of medicine in England!

Some questions regarding processes in pharmaceutical chemistry, put to Mr. Field, were very promptly answered by Mr. Hennell, the operating chemist to the Apothecaries' Company. Was the superintendent unable to answer them himself, or was the operating chemist too anxious to show

his knowledge? We know not, but the questions were what a first year's student of the Edinburgh school would have taken no credit to himself for answering.

ART. XLVI.—RESEARCHES ON THE CHLORIDES AND OXIDES OF MERCURY.—By Robert Kane.

It is a long time since the action of ammonia on corrosive sublimate was first noticed, several facts have been established, and all the chemists who have made it their study, have arrived at different conclusions,—and each has proposed his own theory. A more complete examination of this reaction, which might lead to an exact result, was therefore a desideratum.

Ammonia acts on corrosive sublimate in two ways. Grouvelle and Rose have investigated the action of the gas on the dry sublimate, and the papers of Fourcroy, Hennell, Guibourt, Soubeiran, and Mitcherlich, on its action in a state of solution, show the importance these chemists attach to the subject.

A solution of ammonia, poured into a solution of sublimate, produces a milky precipitate which separates slowly, and resembles recently precipitated alumina. If the precipitate be thrown from hot solutions, or if it be well washed, it has a yellow tint. If, on the contrary, it be boiled in the liquid from which it has separated, a very heavy granular powder, of a canary yellow, is obtained.

This white precipitate is insoluble in water. Its apparent solubility is owing to its decomposition, or to its elements entering into new compounds. Heated in a glass tube closed at one end, it is decomposed below a red heat, giving off a

mixture of ammonia and nitrogen, and, at the same time, calomel is sublimed, generally blackened by a little ammonia, from which it may easily be separated. The precipitate is readily soluble in the nitric and muriatic acids. Mixed with potassa, soda, lime or baryta, ammonia is liberated; the mass becomes yellow, but the decomposition is never complete.

The nature of the products will be given farther on; it must be remarked that an alkali, even in excess, never liberates all the ammonia.

The iodide of potassium produces a red precipitate of deutoiodide of mercury, all the ammonia is disengaged, and the liquid remaining is a solution of caustic potassa. The sulphuret of barium acts in the same way, bisulphuret of mercury being precipitated.

To obtain a perfectly pure precipitate, some precaution is necessary. A cold solution of deutochloride of mercury must be treated with a slight excess of ammonia, the precipitate thrown on a filter and well drained before being washed. It may then be washed with a quantity of water sufficient to displace the first liquid, and this even with great care, for cold water decomposes a small portion of it and its milky colour is lost. Having thus obtained a precipitate which I considered pure, I analyzed it, as the chemists who have studied this compound differ as to its composition. I repeated my analysis several times; and even changed my method of analysis.

1. When a solution of sublimate is precipitated by ammonia, the mercury is contained in the precipitate, and a portion of chlorine remains in solution as sal ammoniac. One hundred grains of sublimate were dissolved in cold water, this solution was decomposed by a slight excess of ammonia, and the precipitate collected and washed on a previously weighed filter; it was dried and weighed with care; the washings were added to the first liquid, the whole acidulated with nitric acid and precipitated by nitrate of silver; the chloride was collected

on a weighed filter and its weight determined. This analysis gave the following results:—

Experiment.	Precipitate.	Chlorine in liquid.
1	91.3	12.6
2	92.4	13.3
3	92.9	13.15
4	95.4	12.7
5	93.4	12.95
Mean,	93.1	13.00

One hundred grains of the sublimate contain 74.09 of mercury and 25.91 of chlorine. Thus the quantity of chlorine remaining in solution was one-half less than that existing in the sublimate; therefore, in 93.1 of the white precipitate, we have 74.09 of mercury, and 12.91 of chlorine.

2. The white precipitate, subjected to heat, gives off gaseous matter, water and calomel. The experiment is thus conducted: a bulb is blown on the end of a tube, which is then weighed, the precipitate is next introduced into it, and its quantity determined by weighing the whole. The heat is applied so as to sublime the calomel without loss, taking care to drive off any water which may have condensed on the sides of the tube; this calomel is black, but on allowing the apparatus to cool in the air and then re-heating the calomel it becomes perfectly white. The tube is again weighed, the loss of weight gives the quantity of water and gaseous matter; the excess over the weight of the empty tube gives the quantity of calomel, and by this we have the quantity of mercury and chlorine.

No. of exper.	Matter used.	Calomel.	Calomel per cent.
1	20.42	18.95	92.80
2	19.42	18.07	92.53
3	12.14	11.28	92.91
4	14.71	13.79	93.68

These results give us for 100 of precipitate a mean of 92.98 of calomel, or

(Hg79.14+Ch13.84.)

3. The calomel treated by chemical agents, to obtain its mercury, gave in the first experiment 77.3 per cent. of precipitate, in a second 78.1 thus giving a mean of 77.7 per cent.

4. 105.40 of white precipitate dissolved in muriatic acid and precipitated by sulphuretted hydrogen, gave a black precipitate, which was collected on a weighed filter and well washed; the washings were added to the liquid, the whole evaporated to dryness and the residue weighed: the results were 95.23 of bisulphuret of mercury, or mercury 82.17+ sulphur 13.06; and 23.57 of sal ammoniac, or muriatic acid, 16.04+ammonia 7.55; or still better, 77.96 mercury+7.16 ammonia (per cent.)

5. 100 grains of the precipitate were put into a phial to which a bent tube was adapted; this tube was placed in weak muriatic acid; a solution of sulphuret of barium was then poured into the phial; heat disengaged ammonia and water; the liquid into which these passed was evaporated to dryness; there remained 21.57 grains, of sal ammoniac or muriatic acid 14.85, ammonia 6.72. The iodide of potassium used in the same way gave for 100 grains 19.83 of sal ammoniac.

6. It has been supposed that the white precipitate contains a quantity of oxygen sufficient to peroxidize all the mercury. Thus far my researches have not led me to this conclusion; for heated in a tube it gives off no oxygen; the oxygen, if there be any, must therefore form water at the expense of the ammonia. To arrive at some conclusion I collected the water, to determine by its weight the quantity of oxygen in the precipitate; some of this was placed in a small weighed retort, to which was fixed a tube containing potassa and unslacked lime, which communicated by another tube with the mercurial trough; the retort was weighed after the introduction of the precipitate, as also the drying tube. The retort was heated until the calomel sublimed. The whole of the water was ab-

sorbed in the tube, and the nitrogen and ammonia collected in a receiver. By my first experiment, I obtained from 22.21 of precipitate 0.22 of water; by a second, 0.14 of water from 20.47 of precipitate. The gaseous mixture, reduced to the desired temperature and pressure, measured 4.24 cubic inches, of which 2.67 were absorbed by water; deducting from the remainder 0.23 for the air of the apparatus, there remained 1.34 per cent., or by weight,

Ammonia, 0.488 gr.
Nitrogen, 0.404.

The following results were obtained by two other experiments:

Experiment.	Precipitate.	Water.	Water per cent.
3	12.14	00.8	0.658
4	19.42	"	"

Which gives a mean of 0.583 per cent. of water; some of this probably arises from the precipitates being inaccurately dried. The mean of my analyses gives for the composition of the precipitate:

Mercury,	78.60
Chlorine,	13.85
Ammonia,	6.77
Water,	0.58
Loss,	0.20
	100.00

The white precipitate is considered by chemists as a compound of one atom of peroxide of mercury and one atom of sal ammoniac.* The great difference in the quantity of mercury sufficiently proves the incorrectness of this theory, besides that my experiments have demonstrated that so large a quantity of oxygen can not exist in the precipitate.

* This white precipitate must not be confounded with the white precipitate of the Parisian Codex; the latter is protochloride of mercury.

Of the powder formed by the action of water on the white precipitate.

It is the general belief that by the action of boiling water the white precipitate is entirely converted into peroxide of mercury: I have never succeeded in performing this experiment; on the contrary, I have found that boiled in water it becomes canary yellow, granular and easy to dry. This powder is not totally insoluble in water; heated it gives off nitrogen, ammonia, water, and a mixture of calomel and mercury sublimed. It is readily soluble in nitric and chlorohydric acids. The alkalies only alter its colour; treated by the iodide of potassium ammonia is disengaged, and a brown powder is produced.

The precipitate from 100 parts of sublimate was thus treated: when it had become yellow, it was thrown on a filter and washed, and the liquid and washings precipitated by nitrate of silver. I give here the mean of several experiments:

Yellow powder 83.83, chlorine in the liquid 18.89.

We thus see that three parts of the chlorine of the sublimate remains in the liquid, and the fourth and all the mercury in the yellow powder.

When white precipitate, already prepared, is boiled in water, a yellow powder is obtained and the liquid above it contains sal ammoniac alone. This reaction enables us to ascertain the composition of the yellow powder. The chlorine of the sal ammoniac was precipitated by nitrate of silver, and its weight determined. Four experiments of this kind gave the following as the composition of the yellow powder:

Mercury, 78.60
Chlorine, 7.56

100 grains of white precipitate, boiled in water, gave 91.15 of yellow powder, and the liquid evaporated to dryness gave 10.23 of sal ammoniac.

Action of an excess of alkali on the white precipitate.

Grouvelle and other chemists assert that an excess of am-

monia produces, in a solution of corrosive sublimate, the ammoniuret of mercury, discovered by Fourcroy and examined by Guibourt.

Dumas says that by treating the ammoniacal precipitate by caustic potassa this ammoniuret is obtained. As my results accord with those of Rose, detailed in his paper, I shall only give the composition of the ammoniuret. Messrs. Rose and Grouvelle have proved satisfactorily that fused corrosive sublimate absorbs gaseous ammonia, and is by its action converted into a white mass, the composition of which is:

$$4(2Ch+Hg)+4NH^3.$$

Action of a solution of ammonia on calomel.

Mr. Hennel states that the result of the decomposition of calomel by water of ammonia is a black powder, containing mercury 96+oxygen 4.

I have arrived at a different conclusion. Exposed to a heat in a tube, the black powder gave traces of water, nitrogen, ammonia, and a mixture of calomel and mercury; 148.15 grains of calomel boiled with an excess of ammonia, gave 141.92 grains of the black powder, and the liquid acidulated and precipitated by nitrate of silver, gave 44.44 grains of dry chloride.

I repeated this analysis, and give the mean of the two: calomel being a compound of,

$$Hg85.117+Ch14.883,$$

The composition of the black powder is:—

Mercury,	88.91
Chlorine,	7.95
Other substances,	3.14
	100.00

To determine the quantity of ammonia in it, I put 66.43 grains into a small matrass to which was fitted a bent tube,

passing into diluted muriatic acid; iodide of potassium was then added to the powder; on exposure to heat, all the ammonia was given off, and the liquid evaporated to dryness gave 6.96 of sal ammoniac, or 3.36 per cent. of ammonia in the black powder, the composition of which is, therefore:—

Mercury,	88.33
Chlorine,	7.95
Ammonia,	3.36
Loss,	0.36
	100.00

Action of ammonia on peroxide of mercury.

To prepare the ammoniuret of mercury, I precipitated a solution of corrosive sublimate by caustic potassa. The precipitate after being well washed was digested for several days in a phial containing ammonia. Its colour became less deep, but never white. I prepared some, also, by boiling the precipitate in ammonia until it ceased to lose colour. Heat very much assisted the reaction. I used these products indiscriminately in my analysis, but never mixed them. This ammoniuret heated, gives off ammonia, water, and becomes red like the peroxide, but when cooled it loses this colour and is evidently unaltered ammoniuret. This reaction does not consist in the decomposition of the ammoniuret into peroxide and ammonia, for from the commencement to the end of the action, water, ammonia, nitrogen, oxygen, and mercury, are disengaged.

Thrown on a live coal it detonates feebly, much less than fulminating gold; it is readily soluble in nitric and chlorohydric acids.

72.07 grains of it were dissolved in muriatic acid; from this solution, diluted with water, 70.08 grains of sulphuret were thrown down by sulphuretted hydrogen. The liquid evaporated gave 9.21 grains of muriate of ammonia; on the supposition that the mercury exists in the compound as peroxide, we will have in 100 parts:—

Mercury,	83.90
Oxygen,	6.63
Ammonia,	4.07
Water and loss,	5.40

Convinced that this water was a constituent of the ammoniuret, I decomposed 12.38 grains in a small retort, furnished with a tube containing caustic potassa to absorb the water. The weight of the tube was increased 0.67; and the mercury sublimed in the neck of the retort, weighed 10.35. We have thus the following composition per cent.:—

Mercury,	83.62
Water,	5.39
Loss and gas,	10.99

The gases are oxygen and ammonia, the former combined with mercury as peroxide of that metal, which gives.—

Mercury,	83.62
Oxygen,	6.60
Ammonia,	4.30
Water,	5.39.

MISCELLANY.

Tannate of Lead.—Autenrieth has recommended this salt strongly in gangrenous states; it especially was beneficial in the case of a girl affected with a nervous fever, whose back was attacked by deep gangrenous sores: it was applied in the form of ointment. The tannate was obtained by precipitating an infusion of oak bark by acetate of lead. The precipitate was collected on a linen cloth and dried. This is the bitannate, which is white. But there are two other tannates: the *neutral tannate*, obtained by boiling the *bitannate* with distilled water; the odd atom of tannic acid is dissolved while the neutral tannate remains; it consists of 65.79 tannic acid and 34.21 oxide of lead. The *basic tannate* is procured by precipitating a solution of tannic acid, or tannate of potash, by disacetate of lead; it is white, but by washing becomes yellowish. Dr. Tott employs the bitannate in the following form:—Dried tannate of lead, 2 drachms; rose ointment, 1 ounce. The ointment is to be intimately mixed, and spread on the sore.—*British Ann. Med.*, June 2, 1837, from *Journ. de Chim. Med.* March, 1837.

Clinical Researches on the influence of certain Medicines upon the functions of the Heart. By H. C. Lombard.—1. *Assafœtida.* M. L. states this to possess remarkable properties in combating the irregularity of the functions of the heart. Employed *externally*, in the form of plaster, it succeeds in alleviating palpitations which have resisted a great variety of medicines. He has almost constantly obtained some alleviation in a great number of cases. Irregular contractions of the ventricles, occurring in persons affected with disease of the heart, are modified; and it likewise succeeds in those cases which may be considered only nervous. The following is the formula used by him: Assafœtida, 2 ounces; gum. ammoniac, 1 scruple; turpentine, 6 drops; yellow wax, a sufficient quantity. Employed *internally*, he has found it likewise to lessen and render regular the movements of the heart. In very small doses, it lessens the palpitations, and produces a remarkable calm; and he considers it a very valuable remedy in nearly all diseases of this organ.

2. *Camphor.*—This medicine, given internally, in variable doses, from three to twelve grains in the day, acts in a special manner upon the heart.

Among persons affected with hypertrophy, with dilatation of the cavities, the nervous influence is often insufficient to produce regular and complete contractions, and hence often tumultuous action. This state he has found can be modified by camphor, and he has seen the most tumultuous ventricular contractions become regular and perfectly isochronous after the administration of a few grains. He is not able to decide whether it acts as a stimulant or a sedative.

3. *Digitalis.*—M. Lombard believes the want of uniformity in the sedative action of this medicine upon the functions of the heart, depends upon the four following circumstances: 1. The state of the stomach; 2, the mode of life of the patient; 3, the doses given; 4, the mode of administration. Sometimes, owing to an irritable state of the stomach, the exhibition of digitalis induces vomiting; and if this continues after the cessation of the medicine, we must not have recourse to antiphlogistic measures, but to antispasmodics; such as the subnitrate of bismuth, oxide of zinc, and effervescing draughts. The mode of administering digitalis is one of the most important points in its therapeutical history. The infusion is the preparation which produces most promptly symptoms of saturation. In the form of powder it rarely produces vomiting, except when the doses are large and frequently repeated. The best medicines for obviating or allaying these symptoms of saturation are calcined magnesia, subnitrate of bismuth, subcarbonate of iron, or oxide of zinc. M. L. considers the subcarbonate of iron as the best, and thinks he can attribute to its use the absence of baneful results among his patients who took digitalis daily for many months.

4. *Polygala Senega.*—The therapeutical action of this medicine is little known. M. Lombard considers it one of the most precious which the materia medica possesses. Administered in the form of extract or infusion, he has found it lower the circulation, and especially regulate the ventricular contractions. The dose employed varied between twelve and twenty-four grains in the course of the day. The infusion, prepared with one drachm to four ounces of water, has been often administered in the same time.—*British and For. Med. Rev.*, from *Bulletin Gen. de Therap.* Nov., 1836.

On the production of Ammonia during the oxidation of Protosulphate of Iron exposed to the air. By M. Sarzeau of Rennes.—For some time past pills have been prepared of a mixture of protosulphate of iron, carbonate of soda, and an inactive powder. An apothecary having occasion to make a mass of this, perceived that it exhaled an ammoniacal odour. He immediately made another mass with new materials; but this time finding no indications of ammonia, he considered its production in the former case accidental. I determined to ascertain if in the oxidation of protosulphate of iron, exposed to the atmosphere, there did not occur a phenomenon

analogous to that observed by Messrs. Austin and Chevalier, during the oxidation of iron under similar circumstances.

I procured several specimens of this salt; all the crystals contained more or less oxide of iron. Pulverized in a glass mortar, and mixed with an excess of caustic potassa, with the addition of a little water, they all gave off ammonia, rarely appreciable by the smell, but rendered very apparent by the presence of nitric acid that did not fume. Ammonia continued thus to be evolved until nearly all the proto-oxide was peroxidized, as was ascertained by occasionally renewing the surface with a pestle. To convince myself that the white vapours, observed in this case, were owing to the presence of ammonia, I treated four hundred grammes of sulphate in a close apparatus, to which was attached a small bottle containing water acidulated with chlorohydric acid. The reaction being completed, the liquid was evaporated; I obtained a notable quantity of a salt which, mixed with potassa, evolved a strong ammoniacal odour. Other specimens of protosulphate, recently prepared, in well formed crystals, and very clear, containing no oxide of iron, were treated in the same manner. They did not immediately give off ammonia, but only some watery vapour, produced by the elevation of temperature of the mixture; as soon, however, as the surface became oxidized, ammoniacal vapours were evolved and continued to be so, as in the other specimens.

We may conclude from these experiments that ammonia is produced by the oxidation of protosulphate of iron exposed to the air, and also when this salt is decomposed by an alkali, being evolved as long as the oxidation continues. *Journ. de Pharm.*

Essential Oil of Potatoes. By M. Augustus Cahours, (L'Institut, No. 199.)—According to Dumas, the essential oil of potatoes is represented by the formula, $C^{20}\ H^{24}\ O^{2}$. M. Cahours infers that this oil is a compound analogous to alcohol and spirit of wood, in consisting of a peculiar compound of carbon and hydrogen for its base, ($C^{20}\ H^{20}$,) united to two atoms of water. He cites the following experiments by himself as proof of the correctness of this view.

The oil treated with sulphuric acid, and subjected to a mild heat, yielded an acid containing the same carburetted hydrogen for its base. This acid formed with bases soluble compounds, whose analogy with sulphovinates is incontestable. The salt of baryta, for example, contained $SO^{3}\ Ba\ O + SO^{3}$, $C^{20}\ H^{20}$, $H^{6}\ O^{3}$. If the oil is put in contact with iodine and phosphorus, an ethereal substance is disengaged, giving off a slightly alliaceous odour, which is similar in composition to hydriodic ether. With nitric acid and chlorine, it afforded products of analogous constitution.—*Amer. Journ. of Science and Arts.*

Silex.—M. Turpin has submitted the silex sent from Berlin by M. Ehren-

berg, to microscopic observation. The magnifying power amounted to 260, and this gentleman found, that the semi-opal of Berlin is a conglomerate of a number of silicious particles and fragments of organic remains, the colour of which varies from transparent white, and passes through yellow, to the deepest and most opaque brown. M. Turpin recognised four different bodies; the first of which he referred to the genus *Gaillonella* of M. Bory St. Vincent, or *Conferva moniliformis;* the second he considered as a different species of the same genus; the third was a mixture of tubular filaments, divided into cells at rare intervals, and remains of infusoria; the fourth was not organic, but served as a basis for rendering the whole solid. The *Silex pyromaque* of Delitzsch, is much richer in organic productions, offering some very remarkable forms, probably belonging to the eggs of Polypi.—*Athenæum, May*, 1837.

Resolutive effects of Carburet of Sulphur upon indolent tumours.—Lampadius in 1826 extolled the employment of this compound, for rheumatism, chronic gout, paralysis, cutaneous eruptions and burns. Since this period, this liquid has been frequently made use of in the north of Europe. Dr. Krimer has employed it anew with happy results in divers affections, and principally in the treatment of indolent tumours which had resisted all kinds of medications. Under this plan of treatment he has administered internally 16 grains of animal charcoal, mixed with the extract of cicuta; whilst externally he has caused to fall from a certain height upon the tumour, from 40 to 50 drops of carburet of sulphur, repeating it three times daily. The affected part was enveloped during the interval in wool or swan's down, and twice a week warm baths slightly alkalized were directed. This method of employing the carburet of sulphur was completely successful in his hands. The external use of the same compound was equally successful with M. Krimer in the case of a young lady who laboured under goitre.

Finally, in several cases of *strangulated hernia*, the author found that no application so much facilitated reduction as the *carburet of sulphur*. Some drops applied to the hernial tumour, reduced it promptly without any manipulation.

M. Otto, of Copenhagen, has also employed with success, in obstinate rheumatic and arthritic affections, the carburet of sulphur according to the following formula:

Take of Carburetted Sulphur, ʒii.
Spirit of Wine, ʒi.
M.

The patients are to take four drops every two hours, at the same time that frictions are made with the following liniment:

Take of Carburet of Sulphur, ʒij.
Olive Oil, ʒi.
M.

By these means a persistent rheumatic affection of the feet accompanied with swelling of the extremities and knees, was removed in a short time.

Journal de Pharmacie.

Indigo. Sulphindilic acid. Analogy between Alcohol and Indigo as regards their combination with sulphuric acid.—M. Dumas presented a memoir to the Institute, in which he states, that he has repeated the analysis of indigo, and has obtained exactly the same results as those obtained by him five years since. His analysis gives as the composition of indigo :—

Carbon,	73.0
Hydrogen,	4.0
Azote,	10.8
Oxygen,	12.2.

The author has endeavoured to determine the nature of the compound formed by the reaction of sulphuric acid upon indigo. It is known that this acid has the power of dissolving indigo and becomes coloured blue in consequence of this solution. Berzelius considered this combination as a species of lacker. M. Dumas, on the contrary, regards it as a compound analogous to sulphovinic acid ; he names it on this account sulphindilic acid ; it results from the combination of two atoms of sulphuric acid with an atom of indigo.

This acid forms with potassa a salt soluble in water, crystallizable in delicate silky needles, of a deep blue colour; it produces with baryta, a salt little soluble in cold, more so in warm water.

From the analysis of these two salts, it results that the formula for indigo is, $C^{32}\ H^{10}\ AZ^2\ O^2$, and that the sulphindilic acid ought to be represented by $2\ SO_3 + C^{32}\ H^{10}\ AZ^2\ O^2$; by adding to this formula, an atom of bas, that of the sulphindilates is obtained. It is known that when indigo is treated with sulphuric acid, a purple substance is often formed, very difficult to be separated from the blue matter. M. Dumas calls this combination sulphopurpuric acid; it is represented by two atoms of indigo and two atoms of sulphuric acid, or of sulphindic acid, plus an atom of indigo. It forms with potassa a purple salt, soluble in water.

White Indigo.—M. Dumas has analyzed the white matter into which indigo is transformed, when submitted to the action of alkalies and reductives; he has found in it the same composition as in indigo itself, with the difference of nearly two atoms of hydrogen which white indigo contains in addition. Hence it is a hyduret of indigo, and not indigo deoxygenized as is generally believed.

Anilic Acid.—This name has been bestowed by M. Dumas upon an acid formerly called indigotic, obtained by the reaction between nitric acid

and indigo. This acid has nearly the same radical as indigo, and is represented by C^{28} H^{8} AZ^{2} O^{9}.

Picric Acid.—This is the last product of the action of nitric acid upon indigo, most generally designated by the name of Bitter of Wetter. It is composed, according to Dumas, of C^{24} H^{4} AZ^{6} O^{13}.

M. Dumas thinks that an oxide of azote enters into its constitution.

Ibid.

Physiological operation of Indigo.—In almost all patients, the use of indigo is succeeded first by squeamishness and vomiting, though the substance itself be tasteless and inodorous. The violence of the emetic efforts appears to be regulated by the individual irritability of the gastric nerves of the patients. Females vomit more readily than males. The vomiting is at first continuous, that is, during the continued use of the agent, and often so violent that the indigo must be given up; but after several days it ceases. It has otherwise the peculiarity that the contraction of the abdominal muscles and the diaphragm is much less violent, and the debility is less considerable than after vomiting induced by other means. The contents of the stomach present nothing unusual, even in respect to taste, only they are of a very dark blue colour, and the fluid is intimately mixed with the indigo, from which it may be inferred that the gastric juice contributes very much to the digestion of the indigo.

Diarrhœa, the second physiological effect of indigo, takes place in general first when the vomiting ceases; yet from this many patients remain altogether exempt. In general, diarrhœa, when once commenced, continues as long as the patients take the indigo, and increases in intensity during the continued use of the remedy. The motions are generally soft, semifluid, and of a dark blue-black colour. The vomiting and diarrhœa are frequently accompanied with slight colicky pains in the stomach and bowels, which, however, may be so violent as to require the indigo to be given up. Those patients who are exempt from vomiting, appear to be attacked with more violent colicky symptoms. By the continued diarrhœa there is formed a species of gastrosis (irritation of the mucous membrane of the stomach and bowels,) with a loss of appetite, headache, and giddiness, and sometimes the sense of dazzling lights in the eyes.

The third physiological operation of indigo is seen in the urinary secretion. The urine assumes a dark violet colour, deepest in the morning. On the quantity of the urine the agent seems to exercise no influence.

Dr. Roth did not observe colouration of the sweat. But it is remarkable, that one patient, after the use of indigo for several weeks, fell often into slight convulsions, similar to those which ensue on the employment of the nitrate of strychnia.

The dose of indigo is regulated by the irritability of the stomach. It is best to begin with grains, and rise gradually to drachms, or even several ounces daily. Dr. Roth gives the preference to the form of electuary, with proportional additions of the aromatic powder, or Dover's powder, as correctives. In the formula employed in the Hospital of the *Charité*, at Berlin, half an ounce of powdered indigo, rubbed up with a few drops of water, is mixed with half a drachm of aromatic powder, and one ounce of simple syrup, and to be taken in divided doses in the course of the day. Many even take from a half to two ounces, twice and four times daily for the space of several months.

In what manner indigo operates, and to what class of medicines it belongs is very difficult to determine, and certainly cannot be inferred from its constituent parts. Probably its active principle is seated in the peculiar colouring matter. Though in many respects the operation of indigo is similar to that of tartar emetic, yet this attacks more forcibly the energy of the organism. In all the patients, after the use of indigo the spasms were at first more frequent and more intense, but shorter in duration; but after some weeks their intensity was manifestly abated, and at length they entirely disappeared. All the patients cured by indigo laboured under idiopathic epilepsy, that is, epilepsy without symptoms of organic lesion. Among those who were improved were several idiopathic and symptomatic cases. In one case of epilepsy, which ensued after a remarkable contusion of the head, after the employment of indigo, a moderately long intermission took place. A boy of 16 years of age, who had laboured for eight years under St. Vitus's dance, and then was attacked with epileptic spasms, was cured of all the symptoms by the use of indigo for six weeks. Of twenty-six epileptic patients treated by means of indigo, there recovered—four males and five females; three males and eight females were improved; and four males and two females remained uncured. In confirmation of the foregoing inferences, the author communicates the history of two cases, in which the treatment by means of indigo operated beneficially, after other means had been unavailing.

Edinburg Med. & Surg. Journal, from *Neue Wissenchoftliche Annalen.*

Mode of Detecting Acetate of Morphia.—Drantz, Laine and others, recommend for the detection of this salt in the intestines, that the latter should be macerated in distilled water, the liquid filtered, and evaporated to the consistence of syrup. This extract, when treated by alcohol, gives up acetate of morphia, which may be obtained in the state of crystals by evaporation.—*Journal de Chim. Med.*

Iodide of Quinine.—This is formed by precipitating sulphate of quinine by means of hydriodate of potash. It is a yellow precipitate, soluble

in alcohol, and crystallizes from this solution in quadrangular prisms. It is a good deal used for the cure of scrofulous tumours, in cases where iodine and tonics are indicated.—*Ibid.*

Pyrophori of easy formation.—M. Vallet has extracted from the Journal fur Praktische Chemie, an account of these combustible compounds. It is known that when two and a half parts in weight of pure dry tartaric acid, deprived of its water of crystallization, and reduced to powder, are rapidly mixed with eight parts of peroxide of lead, in a dry capsule, an ignition of the whole mass results in a little time, which is very vivid and of long continuance. This fact which was first mentioned by Walker, led to the supposition that other organic acids might exhibit the same reaction with peroxide of lead. M. Botliger has repeated the experiment with oxalic and citric acids, and has found that the action of the first upon the peroxide of lead was more prompt, if not stronger than that of tartaric acid, and that of citric acid was feebler. Thus by mixing together 5.25 parts in weight of peroxide of lead with one part of oxalic acid dried by heated air, or containing 19 parts of water of crystallization, an instantaneous ignition of the mass took place, but of less duration than with tartaric acid, because the oxalic acid contains less carbon than this last. In order to obtain a pyrophorus with citric acid, it is necessary to mix promptly at a temperature of from 18° R. one atom of citric acid, previously melted and kept some time in fusion, then dried and pulverized, with two atoms of peroxide of lead. The ignition of the whole mass is as vivid and of as long continuance as with tartaric acid. Minium, litharge, and carbonate of lead mixed with this last acid, equally afford pyrophori according to this author, but not so good as those obtained with the pure oxide.—*Journal de Pharmacie.*